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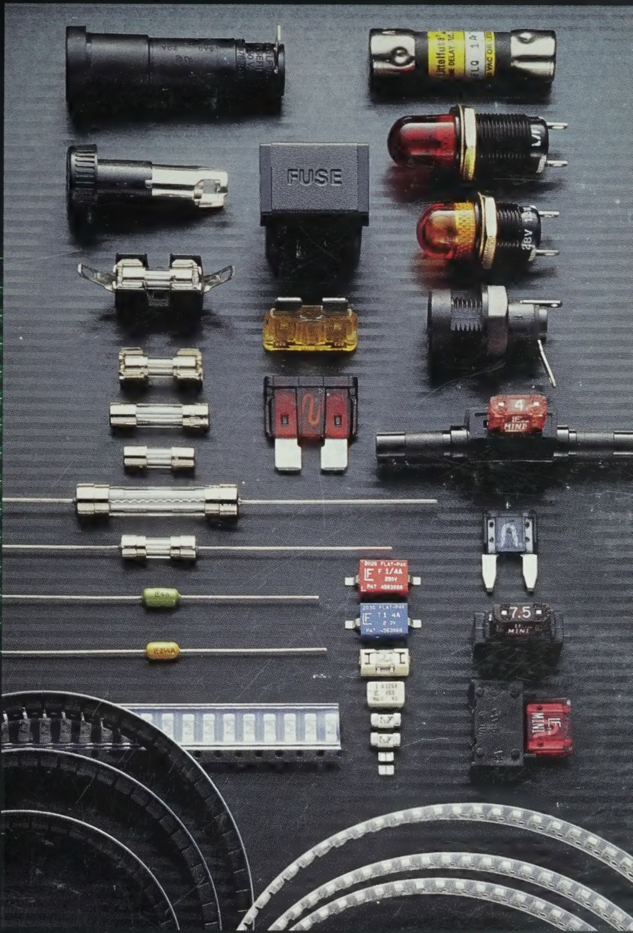
Littelfuse®



ELECTRONIC DESIGNER'S GUIDE

LITTELFUSE®
Leading the Way in Circuit Protection Technology

Littelfuse is the leading producer of advanced innovative circuit protection devices directed to the electronic, electrical power, and automotive markets worldwide.

It began with the manufacture of top quality fuses in 1927 when the company's founder, Edward Sundt, developed the first small, fast-acting fuse capable of protecting sensitive test meters.

Today, Littelfuse has expanded its customer base by directing development and manufacturing activities toward the circuit protection market rather than to fuses alone.

In addition to the headquarters and manufacturing facility located at Des Plaines, Illinois, Littelfuse has manufacturing facilities located in England, Switzerland, and Mexico, as well as Centralia, Arcola, and Watseka, Illinois. Sales, distribution, and engineering facilities are also located in the Netherlands, Singapore, and Farmington Hills, Michigan.

Littelfuse possesses the capability of conducting state-of-the-art development work in a new research and development facility located at Des Plaines, Illinois. This advanced R & D facility consists of both office space and a laboratory capable of performing extremely sophisticated analysis using the latest test equipment. These facilities and the commitment to provide outstanding customer service will enhance the ability of Littelfuse to maintain its leadership position in the electronics arena as we approach the 21st century.

Littelfuse was the first U.S. fuse manufacturer to attain ISO 9001 certification. This certification pertains to quality management systems and applies to the Des Plaines, Illinois headquarters location. ISO 9002 certification was awarded to the electrical power fuse manufacturing facility in Arcola, Illinois, in 1992. The electronic fuse manufacturing facility in Centralia, Illinois earned its ISO 9002 certification in 1993. In addition to these domestic certifications, Littelfuse has been awarded ISO certifications for its facilities in England and Switzerland in 1988 and 1990, respectively.

The Littelfuse Quality Policy

Littelfuse is committed to being sensitive to customer expectations and to providing quality products and services at a competitive price. In support of this commitment, Littelfuse will:

> ***Encourage*** quality awareness and quality performance in all associates at all levels of the Company through management leadership;
>
> ***Promote*** the participation of all associates in making individual contributions to the quality improvement process;
>
> ***Support*** continuous quality improvement by providing our associates with the necessary training, tools, and information feedback to enable enhancement of the quality of our products and services;
>
> ***Develop*** relationships with suppliers who consistently demonstrate their ability to fulfill quality, price and delivery objectives that are mutually beneficial; and,
>
> ***Build*** quality into our products and services, striving for zero defects in everything we do, thereby reducing cost and increasing Total Customer Satisfaction.

Representatives:
Littelfuse has a worldwide network of manufacturers' representatives. If you need direction on contacting your local representative, please call our headquarters location in Des Plaines, Illinois.

Other Littelfuse Literature:
Please contact our Des Plaines, Illinois headquarters to request other Littelfuse literature including the following items.

- *Littelfuse Power-Gard™ Products Catalog* covering 13/32″ × 1½″ and larger fuses which meet the National Electrical Code and CSA requirements for main, feeder, and branch circuit protection.
- *Littelfuse Automotive OEM Products and Capabilities Brochure* which is a reference guide covering fuses, fuseholders, and other special products directed to the automotive market.

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- Centralia, Illinois USA
- Watseka, Illinois USA
- Piedras Negras, Mexico
- Grenchen, Switzerland
- Washington, England
- Seoul, Korea
- Suzhou, China

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The purpose of the Fuseology Section is to promote a better understanding of both fuses and common application details. The fuses to be considered are current sensitive devices which are designed as the intentional weak link in the electrical circuit. The function of the fuse is to provide protection of discrete components, or of complete circuits, by reliably melting under current overload conditions. This fuseology section will cover some important facts about fuses, selection considerations, and standards.

FUSE FACTS

The following fuse parameters or application concepts should be well understood in order to properly select a fuse for a given application.

AMBIENT TEMPERATURE: Refers to the temperature of the air immediately surrounding the fuse and is not to be confused with "room temperature." The fuse ambient temperature is appreciably higher in many cases, because it is enclosed (as in a panel mount fuseholder) or mounted near other heat producing components, such as resistors, transformers, etc.

BREAKING CAPACITY: See Interrupting Rating.

CURRENT RATING: The nominal amperage value marked on the fuse. It is established by the manufacturer as a value of current which the fuse can be loaded to, based on a controlled set of test conditions (See DERATING).

Catalog Fuse part numbers include series identification and amperage ratings. Refer to the FUSE SELECTION GUIDE and TIME CURRENT CURVE sections for guidance on making the proper choice.

DERATING: For 25°C ambient temperatures, it is recommended that fuses be operated at no more than 75% of the nominal current rating established using the controlled test conditions. These test conditions are part of Underwriters Laboratories Standard 198G "Fuses for Supplementary Overcurrent Protection," whose primary objective is to specify common test standards necessary for the continued control of manufactured items intended for protection against fire, etc. Some common variations of these standards include: fully enclosed fuseholders, high contact resistances, air movement, transient spikes, and changes in connecting cable size (diameter and length). Fuses are essentially temperature-sensitive devices. Even small variations from the controlled test conditions can greatly affect the predicted life of a fuse when it is loaded to its nominal value, usually expressed as 100% of rating.

The circuit design engineer should clearly understand that the purpose of these controlled test conditions is to enable fuse manufacturers to maintain unified performance standards for their products, and he must account for the variable conditions of his application. To compensate for these variables, the circuit design engineer who is designing for trouble-free, long-life fuse protection in his equipment generally loads his fuse not more than 75% of the nominal rating listed by the manufacturer, keeping in mind that overload and short circuit protection must be adequately provided for.

The fuses under discussion are temperature-sensitive devices whose ratings have been established in a 25°C ambient. The fuse temperature generated by the current passing through the fuse increases or decreases with ambient temperature change.

The ambient temperature chart in the Fuse Selection section illustrates the effect that ambient temperature has on the nominal current rating of a fuse. Most traditional Slo-Blo® designs use lower melting temperature materials and are, therefore, more sensitive to ambient temperature changes.

DIMENSIONS: Unless otherwise specified, dimensions are in inches. The fuses in this catalog range in size from the approx. 1206 chip size (.122″L × .063″W × .0047″H) up to the 5 AG, also commonly known as a "MIDGET" fuse (13/32″ dia. × 1½″ length). As new products were developed throughout the years, fuse sizes evolved to fill the various electrical circuit protection needs. The first fuses were simple, open-wire devices, followed in the 1890's by Edison's enclosure of thin wire in a lamp base to make the first plug fuse. By 1904, Underwriters' Laboratories had established size and rating specifications to meet safety standards. The renewable type fuses and automotive fuses appeared in 1914, and in 1927 Littelfuse started making very low amperage fuses for the budding electronics industry.

The fuse sizes in the chart below began with the early "Automobile Glass" fuses, thus the term "AG". The numbers were applied chronologically as different manufacturers started making a new size: "3AG," for example, was the third size placed on the market. Other non-glass fuse sizes and constructions were determined by functional requirements, but they still retained the length or diameter dimensions of the glass fuses. Their designation was modified to AB in place of AG, indicating that the outer tube was constructed from Bakelite, fibre, ceramic, or a similar material other than glass. The largest size fuse shown in the chart is the 5AG, or "MIDGET," a name adopted from its use by the electrical industry and the National Electric Code range which normally recognizes fuses of 9/16″ × 2″ as the smallest standard fuse in use.

FUSE SIZES

SIZE	DIAMETER (Inches)		LENGTH (Inches)	
1AG	1/4	.250	5/8	.625
2AG	—	.177	—	.588
3AG	1/4	.250	1¼	1.25
4AG	9/32	.281	1¼	1.25
5AG	13/32	.406	1½	1.50
7AG	1/4	.250	7/8	.875
8AG	1/4	.250	1	1

TOLERANCES: The dimensions shown in this catalog are nominal. Unless otherwise specified, tolerances are applied as follows:

± .010″ for dimensions to 2 decimal places.
± .005″ for dimensions to 3 decimal places.

The factory should be contacted concerning metric system and fractional tolerances. Tolerances do not apply to lead lengths.

FUSE CHARACTERISTICS: The characteristic of a fuse design refers to how rapidly the fuse responds to various current overloads. Fuse characteristics can be classified into three general categories: very fast-acting, fast-acting, or Slo-Blo®. The distinguishing feature of Slo-Blo® fuses is that these fuses have additional thermal inertia designed to tolerate normal initial or start-up overload pulses.

FUSE CONSTRUCTION: Internal construction may vary depending on ampere rating. Fuse photos in this catalog

FUSE FACTS

show typical construction of a particular ampere rating within the fuse series.

FUSEHOLDERS: In many applications, fuses are installed in fuseholders. These fuses and their associated fuseholders are not intended for operation as a "switch" for turning power "on" and "off".

INTERRUPTING RATING: Also known as breaking capacity or short circuit rating, interrupting rating is the maximum approved current which the fuse can safely interrupt at rated voltage. During a fault or short circuit condition, a fuse may receive an instantaneous overload current many times greater than its normal operating current. Safe operation requires that the fuse remain intact (no explosion or body rupture) and clear the circuit.

Interrupting ratings may vary with fuse design and range from 35 amperes AC for some 250V metric size (5 × 20mm) fuses up to 200,000 amperes AC for the 600V KLK series. Information on other fuse series can be obtained from the factory.

Fuses listed in accordance with UL Standard 198G are required to have an interrupting rating of 10,000 amperes, with some exceptions (See STANDARDS SECTION) which, in many applications, provide a safety factor far in excess of the short circuit currents available.

NUISANCE OPENING: Nuisance opening is most often caused by an incomplete analysis of the circuit under consideration. Of all the "Selection Factors" listed in the FUSE SELECTION GUIDE, special attention must be given to items 1, 3, and 6 below, namely, normal operating current, ambient temperature, and pulses. For example, one prevalent cause of nuisance opening in conventional power supplies is the failure to adequately consider the fuse's nominal melting I^2t rating. The fuse cannot be selected solely on the basis of normal operating current and ambient temperature. In this application, the fuse's nominal melting I^2t rating must also meet the inrush current requirements created by the input capacitor of the power supply's smoothing filter. The procedure for converting various waveforms into I^2t circuit demand is given in the FUSE SELECTION GUIDE. For trouble-free, long-life fuse protection, it is good design practice to select a fuse such that the I^2t of the waveform is no more than 20% of the nominal melting I^2t rating of the fuse. Refer to the section on PULSES in the FUSE SELECTION GUIDE.

RESISTANCE: The resistance of a fuse is usually an insignificant part of the total circuit resistance. Since the resistance of fractional amperage fuses can be several ohms, this fact should be considered when using them in low-voltage circuits. Actual values can be obtained from the factory. Most fuses are manufactured from materials which have positive temperature coefficients, and, therefore, it is common to refer to cold resistance and hot resistance (voltage drop at rated current), with actual operation being somewhere in between. Cold resistance is the resistance obtained using a measuring current of no more than 10% of the fuse's nominal rated current. Values shown in this publication for cold resistance are nominal and representative. The factory should be consulted if this parameter is critical to the design analysis. Hot resistance is the resistance calculated from the stabilized voltage drop across the fuse, with current equal to the nominal rated current flowing through it.

Resistance data on all of our fuses is available on request. Fuses can be supplied to specified controlled resistance tolerances at additional cost.

SHORT CIRCUIT RATING: See Interrupting Rating.

SOLDERING RECOMMENDATIONS: Since most fuse constructions incorporate soldered connections, caution should be used when installing those fuses intended to be soldered in place. The application of excessive heat can reflow the solder within the fuse and change its rating. Fuses are heat-sensitive components similar to semiconductors, and the use of heat sinks during soldering is often recommended.

TESTING SAMPLING PLAN: Because compliance with certain specifications requires destructive testing, commonly accepted methods are employed on a statistical basis for each lot manufactured.

TIME-CURRENT CURVE: The graphical presentation of the fusing characteristic, time-current curves are generally average curves which are presented as a design aid but are not generally considered part of the fuse specification. Time-current curves are extremely useful in defining a fuse, since fuses with the same current rating can be represented by considerably different time-current curves. The fuse specification typically will include a life requirement at 100% or 110% rating and maximum opening times at overload points (usually 135% and 200% of rating). Compliance with the specification requires destructive testing, which is done on a statistical basis for each lot manufactured. A time-current curve represents average data for the design; however, there may be some differences in the average values for any one given production lot. Samples should be tested to verify performance, once the fuse has been selected.

UNDERWRITERS LABORATORIES: Reference to "Listed by Underwriters Laboratories" signifies that the fuses meet the requirements of Underwriters Laboratories Standard, "Fuses for Supplementary Overcurrent Protection" No. 198G. Some 32 volt fuses in this catalog are listed under UL Standard 275. Reference to "Recognized under the Component Program of Underwriters Laboratories" signifies that the item is recognized under the component program of Underwriters Laboratories and application approval is required.

VOLTAGE RATING: The voltage rating, as marked on a fuse, indicates that the fuse can be relied upon to safely interrupt its rated short circuit current in a circuit where the voltage is equal to, or less than, its rated voltage. This system of voltage rating is covered by N.E.C. regulations and is a requirement of Underwriters Laboratories as a protection against fire risk. The standard voltage ratings used by fuse manufacturers for most small-dimension and midget fuses are 32, 125, 250 and 600.

In electronic equipment with relatively low output power supplies, with circuit impedance limiting short circuit currents to values of less than ten times the current rating of the fuse, it is common practice to specify fuses with 125 or 250 volt ratings for secondary circuit protection of 500 volts or higher.

As mentioned previously (See DERATING), fuses are sensitive to changes in current, not voltage, maintaining their "status quo" at any voltage from zero to the maximum rating of the fuse. It is not until the fuse wire melts and

FUSE FACTS

arcing occurs that the circuit voltage and available power become an issue. The safe interruption of the circuit, as it relates to circuit voltage and available power, is discussed in the section on INTERRUPTING RATING.

To summarize, a fuse may be used at any voltage that is less than its voltage rating without detriment to its fusing characteristics. It may also be used at voltages higher than its certified voltage rating if the maximum power level available at the fuse under a "dead short" condition can only produce a low-energy, non-destructive arc.

DERIVATION OF NOMINAL MELTING I^2t: Laboratory tests are conducted on each fuse design to determine the amount of energy required to melt the fusing element. This energy is described as nominal melting I^2t and is expressed as "Ampere Squared Seconds" (A^2 Sec.). A pulse of current is applied to the fuse, and a time measurement is taken for melting to occur. If melting does not occur within a short duration of about 8 milliseconds (0.008 seconds) or less, the level of pulse current is increased. This test procedure is repeated until melting of the fuse element is confined to within about 8 milliseconds. The purpose of this procedure is to assure that the heat created has insufficient time to thermally conduct away from the fuse element. That is, all of the heat energy (I^2t) is used, to cause melting. Once the measurements of current (I) and time (t) are determined, it is a simple matter to calculate melting I^2t. When the melting phase reaches completion, an electrical arc occurs immediately prior to the "opening" of the fuse element. The nominal I^2t values given in this publication pertain to the melting phase portion of the "clearing" or "opening".

FUSE SELECTION GUIDE

Many of the factors involved with fuse selection are listed below:

Selection Factors

1. Normal operating current
2. Application voltage (AC or DC)
3. Ambient temperature
4. Overload current and length of time in which the fuse must open
5. Maximum available fault current
6. Pulses, Surge Currents, Inrush Currents, Start-up Currents, and Circuit Transients
7. Physical size limitations, such as length, diameter, or height
8. Agency certifications required, such as UL, CSA, VDE, or Military
9. Considerations: ease of removal, axial leads, visual indication, etc.
10. Fuseholder features: clips, mounting block, panel mount, p.c. board mount, R.F.I. shielded, etc.

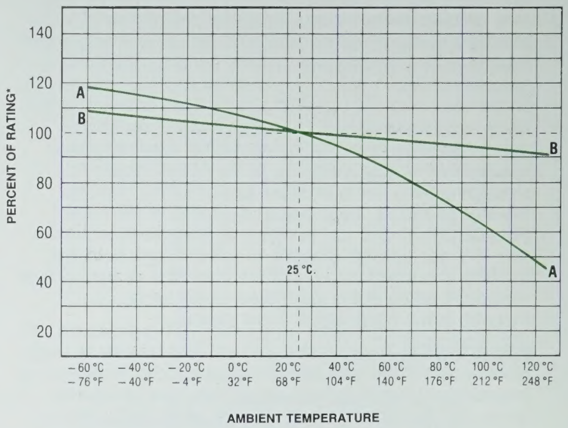
NORMAL OPERATING CURRENT: The current rating of a fuse is typically derated 25% for operation at 25°C to avoid nuisance blowing. For example, a fuse with a current rating of 10A is not usually recommended for operation at more than 7.5A in a 25°C ambient. For additional details, see DERATING in the previous section and AMBIENT TEMPERATURE below.

VOLTAGE: The voltage rating of the fuse must be equal to, or greater than, the available circuit voltage. For exceptions, see VOLTAGE RATING.

AMBIENT TEMPERATURE: The current carrying capacity tests of fuses are performed at 25°C and will be affected by changes in ambient temperature. The higher the ambient temperature, the hotter the fuse will operate, and the shorter its life will be. Conversely, operating at a lower temperature will prolong fuse life. A fuse also runs hotter as the normal operating current approaches or exceeds the rating of the selected fuse. Practical experience indicates fuses at **room temperature** should last indefinitely, if operated at no more than 75% of catalog fuse rating.

CHART SHOWING EFFECT OF AMBIENT TEMPERATURE ON CURRENT-CARRYING CAPACITY(Typical)

KEY TO CHART:
Curve A: Traditional Slo-Blo® Fuses
Curve B: Very Fast-Acting,Fast-Acting, and Spiral Wound Slo-Blo® Fuses



* Ambient temperature effects are in addition to the normal derating, see example.

Example: Given a normal operating current of 1.5 amperes in an application using a traditional Slo-Blo® fuse at room temperature, then:

$$\text{Catalog Fuse Rating} = \frac{\text{Normal Operating Current}}{0.75}$$

or

$$\frac{1.5 \text{ Amperes}}{0.75} = 2.0 \text{ Amp Fuse (at 25°C)}$$

FUSE SELECTION GUIDE

Similarly, if that same fuse were operated at a very high ambient temperature of 70°C, additional derating would be necessary. Curve "A" (Traditional Slo-Blo®) of the ambient temperature chart shows the maximum operating "Percent of Rating" at 70°C to be 80%, in which case;

$$\text{Catalog Fuse Rating} = \frac{\text{Normal Operating Current}}{0.75 \times \text{Percent of Rating}}$$

or

$$\frac{1.5\text{ Amperes}}{0.75 \times 0.80} = 2.5\text{ Amp Fuse (at }70°\text{C)}$$

OVERLOAD CURRENT CONDITION: It is current level for which protection is required. Fault conditions may be specified, either in terms of current or, in terms of both current and maximum time the fault can be tolerated before damage occurs. Time-current curves should be consulted to try to match the fuse characteristic to the circuit needs, while keeping in mind that the curves are based on average data.

MAXIMUM FAULT CURRENT: The Interrupting Rating of a fuse must meet or exceed the Maximum Fault Current of the circuit.

PULSES: The general term "pulses" is used in this context to describe the broad category of wave shapes referred to as "surge currents", "start-up currents", "inrush currents", and "transients". Electrical pulse conditions can vary considerably from one application to another. Different fuse constructions may not all react the same to a given pulse condition. Electrical pulses produce thermal cycling and possible mechanical fatigue that could affect the life of the fuse. Initial or start-up pulses are normal for some applications and require the characteristic of a Slo-Blo® fuse. Slo-Blo® fuses incorporate a thermal delay design to enable them to survive normal start-up pulses and still provide protection against prolonged overloads. The start-up pulse should be defined and then compared to the time-current curve and I^2t rating for the fuse. Application testing is recommended to establish the ability of the fuse design to withstand the pulse conditions.

Nominal melting I^2t is a measure of the energy required to melt the fusing element and is expressed as "Ampere Squared Seconds" (A^2 Sec.). This nominal melting I^2t, and the energy it represents (within a time duration of 8 milliseconds [0.008 second] or less), is a value that is constant for each different fusing element. Because every fuse type and rating, as well as its corresponding part number, has a different fusing element, it is necessary to determine the I^2t for each. This I^2t value is a parameter of the fuse itself and is controlled by the element material and the configuration of the fuse element. In addition to selecting fuses on the basis of "Normal Operating Currents", "Derating", and "Ambient Temperature" as discussed earlier, it also is necessary to apply the I^2t design approach. This nominal melting I^2t is not only a constant value for each fuse element design, but it is also independent of temperature and voltage. Most often, the nominal melting I^2t method of fuse selection is applied to those applications in which the fuse must sustain large current pulses of a short duration. These high-energy currents are common in many applications and are described by a variety of terms, such as surge current, start-up current, inrush current, and other similar circuit transients that can be classified in the general category of "pulses." Laboratory tests are conducted on each fuse design to determine its nominal melting I^2t rating. The values for I^2t given in this publication are nominal and representative. The factory should be consulted if this parameter is critical to the design analysis. The following example should assist in providing a better understanding of the application of I^2t.

EXAMPLE: Select a 125V, very fast-acting Picofuse that is capable of withstanding 100,000 pulses of current (I) of the pulse waveform shown in Figure 1. The normal operating current is 0.75 ampere at an ambient temperature of 25°C.

Step 1 — Refer to Chart I and select the appropriate pulse waveform, which is waveform (E) in this example. Place the applicable value for peak pulse current (i_p) and time (t) into the corresponding formula for waveshape (E), and calculate the result, as shown:

$$I^2t = \frac{1}{5}(i_p)^2t$$

$$= \frac{1}{5} \times 8^2 \times .004 = 0.0512\ A^2\text{ Sec.}$$

This value is referred to as the "Pulse I^2t".

Step 2 — Determine the required value of Nominal Melting I^2t by referring to Chart II. A figure of 22% is shown in Chart II for 100,000 occurrences of the Pulse I^2t calculated in Step 1. This Pulse I^2t is converted to its required value of Nominal Melting I^2t as follows:

$$\text{Nom. Melt } I^2t = \text{Pulse } I^2t/.22$$

$$= 0.0512/.22 = 0.2327\ A^2\text{ Sec.}$$

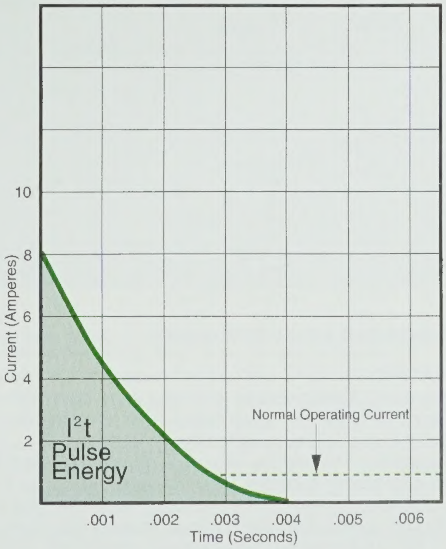
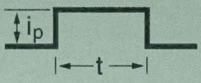
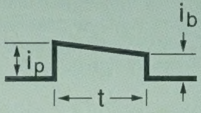
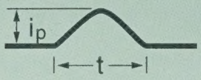
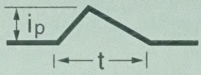
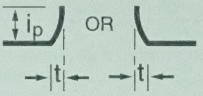
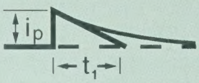


Figure 1

FUSE SELECTION GUIDE

CHART I

	WAVESHAPES	FORMULAS
A		$i = k$ $I^2 t = i_p^2 t$
B		$i = i_p - kt$ $I^2 t = (1/3)(i_p^2 + i_p i_b + i_b^2) t$
C		$i = i_p \sin t$ $I^2 t = (1/2) i_p^2 t$
D		$I^2 t = (1/3) i_p^2 t$
E		$i = kt^2$ OR $i = i_p(1-kt)^2$ $I^2 t = (1/5) i_p^2 t$
F		$i = i_p e^{-kt}$ $I^2 t \cong (1/2) i_p^2 t_1$

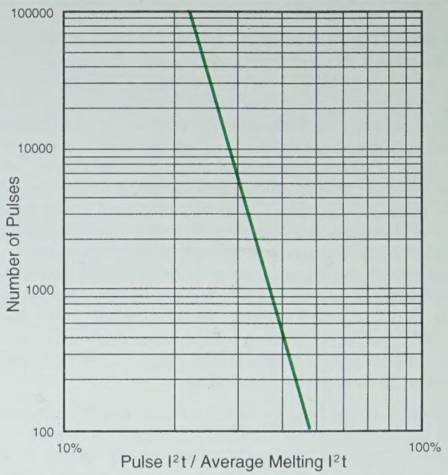
Step 3 — Examine the I^2t rating data for the Pico II, 125V, very fast-acting fuse. The part number 251001, 1 ampere design is rated at 0.281 A^2 Sec., which is the minimum fuse rating that will accommodate the 0.2327 A^2 Sec. value calculated in Step 2. This 1 ampere fuse will also accommodate the specified 0.75 ampere normal operating current, when a 25% derating factor is applied to the 1 ampere rating, as previously described.

TESTING: The above factors should be considered in selecting a fuse for a given application. The next step is to verify the selection by requesting samples for testing in the actual circuit. Before evaluating the samples, make sure the fuse is properly mounted with good electrical connections, using adequately sized wires. The testing should include life tests under normal conditions and overload tests under fault conditions, to ensure that the fuse will operate properly in the circuit.

CHART II

PULSE CYCLE WITHSTAND CAPABILITY

100,000 Pulses	Pulse I^2t = 22% of Nominal Melting I^2t
10,000 Pulses	Pulse I^2t = 29% of Nominal Melting I^2t
1,000 Pulses	Pulse I^2t = 38% of Nominal Melting I^2t
100 Pulses	Pulse I^2t = 48% of Nominal Melting I^2t



Note: Adequate time (10 seconds) must exist between pulse events to allow heat from the previous event to dissipate.

FUSEHOLDER SELECTION GUIDE

DERATING: For 25°C ambient temperatures, it is recommended that fuseholders be operated at no more than 60% of the nominal current rating established using the controlled test conditions specified by Underwriters Laboratories. The primary objective of these UL test conditions is to specify common test standards necessary for the continued control of manufactured items intended for protection against fire, etc. A copper dummy fuse is inserted in the fuseholder by Underwriters Laboratories, and then the current is increased until a certain temperature rise occurs. The majority of the heat is produced by the contact resistance of the fuseholder clips. This value of current is considered to be the rated current of the fuseholder, expressed as 100% of rating. Some of the more common, everyday applications may differ from these UL test conditions as follows: fully enclosed fuseholders, high contact resistance, air movement, transient spikes, and changes in connecting cable size (diameter and length). Even small variations from the controlled test conditions can greatly affect the ratings of the fuseholder. For this reason, it is recommended that fuseholders be derated by 40% (operated at no more than 60% of the nominal current rating established using the Underwriter Laboratories test conditions, as stated above).

Littelfuse is at your service to help solve your electrical protection problems. When contacting Littelfuse sales engineers, please have all the requirements of your applications available. Requests for quotes or assistance in designing or selecting special types of circuit protection components for your particular applications are also welcome.

In the absence of special requirements, Littelfuse reserves the right to make appropriate changes in design, process, and manufacturing location without prior notice.

STANDARDS

Fuse ratings and other performance criteria are evaluated under laboratory conditions **and acceptance criteria**, as defined in one or more of the various fuse standards. It is important to understand these standards so that the fuse can be properly applied to circuit protection applications.

UL/CSA 248-14 FUSES FOR SUPPLEMENTARY OVERCURRENT PROTECTION (600Volts, Maximum) (Previously UL 198G and CSA C22.2, No. 59)

UL LISTED

A UL Listed fuse meets all the requirements of the UL/CSA 248-14 Standard. Following are some of the requirements.

UL ampere rating tests are conducted at 110%, 135%, and 200% of rated current. The fuse must carry 110% of its ampere rating and must stabilize at a temperature that does not exceed a 75°C rise.

The fuse must open at 135% of rated current within one hour. It also must open at 200% of rated current within 2 minutes for 0-30 ampere ratings and 4 minutes for 35-60 amperer ratings.

The interrupting rating of a UL Listed fuse is 10,000 amperes AC minimum at 125 volts. Fuses rated at 250 volts may be listed as interrupting 10,000 amperes at 125 volts and, at least, the minimum values shown below at 250 volts.

Ampere Rating of Fuse	Interrupting Rating In Amperes	Voltage Rating
0 to 1	35	250 VAC
1.1 to 3.5	100	250 VAC
3.6 to 10	200	250 VAC
10.1 to 15	750	250 VAC
15.1 to 30	1500	250 VAC

Recognized Under the Component Program of Underwriters Laboratories

The Recognized Program of UL is different from UL Listing. UL will test a fuse to a specification requested by the manufacturer. The test points can be different from the UL Listed requirements if the fuse has been designed for a specific application. Application approval is required by UL for fuses recognized under the Component Program.

UL 275 AUTOMOTIVE GLASS TUBE FUSES (32 Volts)

UL Listed

UL ampere ratings tests are conducted at 110%, 135%, and 200%. Interrupting rating tests are not required.

CSA Certification

CSA Certification in Canada is equivalent to UL Listing approval in the United States.

The Component Acceptance Program of CSA is an equivalent to the Recognition Program at UL. This CSA Program allows the manufacturer to create the specification. CSA then verifies the test results.

MITI APPROVAL

MITI approval in Japan is similar to UL Listing approval in the United States.

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

Publication 127, Sheet I, II, III, V (250 Volts)

The IEC organization is different from UL and CSA, since IEC only writes specifications and does not give approval. UL and CSA write the specifications, are responsible for testing, and give approvals.

Approvals to IEC specifications are given by such organizations as SEMKO (Swedish Institute of Testing and Approvals of Electrical Equipment) Ⓢ and BSI (British Standards Institute, as well as UL and CSA.

IEC Publication 127 defines two breaking capacity levels (interrupting rating). Low breaking capacity fuses must pass a test of 35 amperes or ten times rated current, which ever is greater, while high breaking capacity fuses must pass a test of 1500 amperes.

Sheet I — Type F Quick Acting, High Breaking Capacity

Sheet II — Type F Quick Acting, Low Breaking Capacity

Sheet III — Type T Time Lag, Low Breaking Capacity

Sheet V — Type T Time Lag, High Breaking Capacity

The letters 'F' and 'T' represent the time-current characteristic of the Type F and Type T fuses. One of these letters will be marked on the end cap of the fuse.

UL/CSA 248-14 vs. IEC 127 FUSE OPENING TIMES (UL/CSA 248-14 Was Previously UL 198G and CSA 22.2, No. 59)

Percent of Rating	UL & CSA STD 248-14	IEC Type F Sheet I (*)	IEC Type F Sheet II (*)	IEC Type T Sheet III (*)	IEC Type T Sheet V (*)
110	4 Hours Min.	—	—	—	—
135	60 Minutes Max.	—	—	—	—
150	—	60 Minutes Min.	60 Minutes Min.	60 Minutes Min.	60 Minutes Min.
200	2 Minutes Max.	—	—	—	—
210	—	30 Minutes Max.	30 Minutes Max.	2 Minutes Max.	30 Minutes Max.

(*) Note: The IEC Specification is only written up to 6.3A, any components above these ratings are not recognized by the IEC (although the fuses will have those opening characteristics).

IEC also has requirements at 275%, 400% and 1000%; however, the chart is used to show that fuses with the same ampere rating made to different specifications are not interchangeable. According to the IEC 127 Standard, a one ampere-rated fuse can be operated at one ampere. A one ampere-rated fuse made to UL Standard 198G should not be operated at more than .75 ampere (25% derated — See DERATING SECTION OF FUSEOLOGY).

STANDARDS

MILITARY/FEDERAL STANDARDS
See Table of Contents for Military Product Section.

Mil-F-15160 and Mil-F-23419

These specifications govern the construction and performance of fuses suitable primarily for military electronic applications.

Fuses approved to the following Military specifications are on the Qualified Products List (QPL) for that specification.

MIL-F-19207

This specification governs the construction and performance of fuseholders suitable for military applications.

MIL-L-3661

This specification governs the construction and performance of cartridge lamps, lenses, and lampholders suitable for military applications.

DESC Drawing #87108

This drawing governs the construction and performance of .177″ × .570″ (2AG size) cartridge fuses and axial lead versions suitable for military applications. DESC #87108 designation is included in the fuse end cap marking.

FEDERAL SPECIFICATION W-F-1814

This specification governs the construction and performance of cartridge fuses with high interrupting ratings that are approved for federal applications. Fuses approved to these specifications are on the Federal Qualified Products List.

Write to the following agencies for additional information on standards, approvals, or copies of the specifications.

Underwriters Laboratories Inc. (UL)
333 Pfingsten Road
Northbrook, IL 60062
Att: Publications Stock

Canadian Standards Association (CSA)
178 Rexdale Boulevard
Rexdale, Ontario, Canada M9W 1R3
Att: Standard Sales

International Electrotechnical Commission (IEC)
3, Rue de Varembe
1211 Geneva 20
Switzerland
Att: Sales Department

Naval Publications and Military Standards Form Center (for Military and Federal Standards)
5801 Tabor Avenue
Philadelphia, PA 19120
Att: Commanding Officer

Defense Electronics Supply Center (DESC)
1507 Wilmington Pike
Dayton, OH 45444-5000
Att: Specifications Dept./EMM

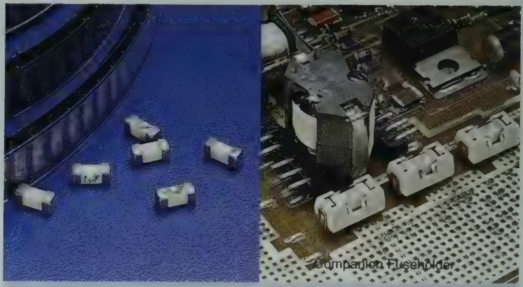
Ministry of International Trade and Industry (MITI)
Kasumigaseki
Chi-Youda-Ku
Tokyo 100, Japan

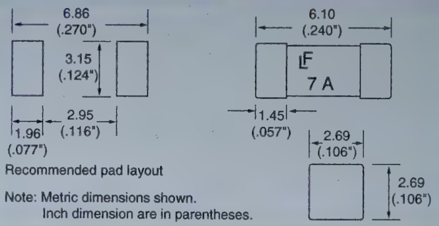
FUSES

SUBMINIATURE SURFACE MOUNT

Nano^{2}® SMF Very Fast-Acting Type

The Nano^{2} SMF is a very small, square surface mount fuse design that exhibits electrical characteristics similar to the Littelfuse 271000 Nanofuse series.


Companion Fuseholder



Recommended pad layout

Note: Metric dimensions shown.
Inch dimension are in parentheses.

Refer to pg. 64 for SMF Omni-Blok Holder, Series **154** 000.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
100%	1/16–15	4 hours, **Minimum**
200%	1/16–10	5 seconds **Maximum**
200%	12–15	20 seconds, **Maximum**

AGENCY APPROVALS: ° Recognized under the Components Program of Underwriters Laboratories and Certified by CSA. Approved by MITI from 1 through 5 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:
100 amperes at 125VAC (1/16A – 10A)
50 amperes at 125 VAC (12A – 15A)
300 amperes at 125VDC (1/16A – 15A)

ENVIRONMENTAL SPECIFICATIONS:

Operating Temperature: –55°C to 125°C.

Shock: MIL-STD-202, Method 213, Test Condition I (100 G's peak for 6 milliseconds).

Vibration: MIL-STD-202, Method 201 (10–55 Hz, .06 in. total excursion).

Salt Spray: MIL-STD-202, Method 101, Test Condition B (48 hrs.).

Insulation Resistance (After Opening) MIL-STD-202, Method 302, Test Condition A, (10,000 ohms minimum).

Resistance to Soldering Heat: MIL-STD-202, Method 210, Test Condition F (20 sec. at 260°C).

Thermal Shock: MIL-STD-202, Method 107, Test Condition B (–65 to 125°C).

Moisture Resistance: MIL-STD-202, Method 106, High Humidity (90-98 RH), Heat (65°).

PHYSICAL SPECIFICATIONS:

Materials: Ceramic Body/Tin-Lead Alloy Plated Brass Caps. 1/8 Amp and below are silver plated.

Soldering parameters:
Wave solder — 500°F (260°C), 10 sec.
Infrared — 500°F (260°C), 30 sec.

Solderability: MIL-STD-202, Method 208.

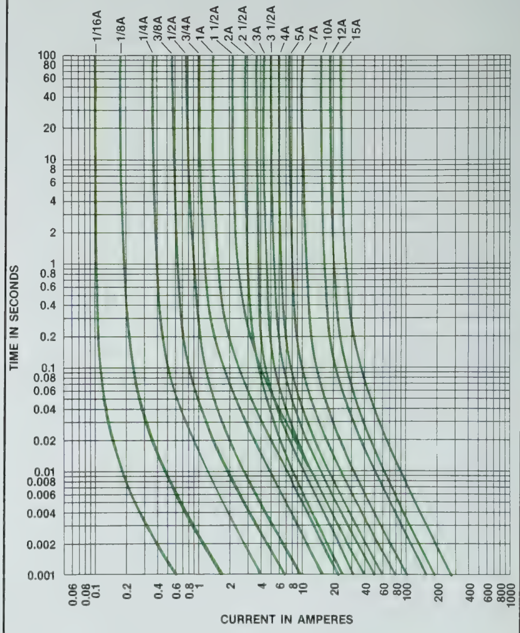
Packaging: 12mm Tape on 7 inch Reel per EIA Standard 481. 1000 fuses per reel.

PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
R451.062	1/16	125	8.40	0.00019
R451.125	1/8	125	2.65	0.00286
R451.250	1/4	125	1.05	0.01126
R451.375	3/8	125	0.610	0.0425
R451.500	1/2	125	0.420	0.0795
R451.750	3/4	125	0.245	0.185
R451 001	1	125	0.165	0.459
R451 01.5	1 1/2	125	0.0610	0.853
R451 002	2	125	0.037	0.53
R451 02.5	2 1/2	125	0.0280	1.029
R451 003	3	125	0.0228	1.65
R451 03.5	3 1/2	125	0.0190	2.469
R451 004	4	125	0.0163	3.152
R451 005	5	125	0.0126	5.566
R451 007	7	125	0.0086	10.32
R451 010	10	125	0.0057	26.46
R451 012	12	125	0.0046	47.97
R451 015	15	125	0.0035	97.82

Average Time Current Curves



SUBMINIATURE SURFACE MOUNT

Nano²® SMF Slo-Blo® Type Fuse

The very small Nano² Fuse is now available with time delay performance characteristics. This Slo-Blo Nano² Fuse is the smallest surface mount time delay fuse available. The unique time delay feature of this fuse design helps solve the problem of nuisance "opening" by accommodating inrush currents that normally cause a fast-acting fuse to open.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
100%	4 hours, **Minimum**
200%	1 second, **Min.**: 60 seconds, **Max.**
300%	0.2 seconds, **Min.**: 3 seconds, **Max.**
800%	0.02 seconds, **Min.**: 0.1 seconds, **Max.**

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:
50 amperes at 125VAC.
50 amperes at 125VDC.

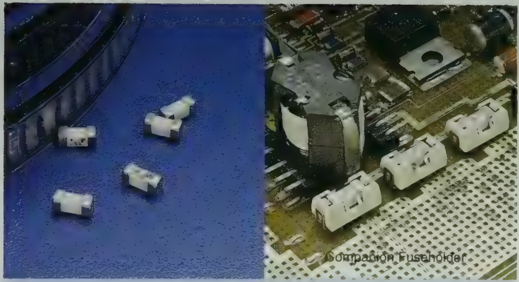
ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: −55°C to 125°C.
Shock: MIL-STD-202, Method 213, Test Condition I (100 G's peak for 6 milliseconds).
Vibration: MIL-STD-202, Method 201 (10–55 Hz, .06 in. total excursion).
Salt Spray: MIL-STD-202, Method 101, Test Condition B (48 hrs.).
Insulation Resistance (After Opening) MIL-STD-202, Method 302, Test Condition A, (10,000 ohms minimum).
Resistance to Soldering Heat: MIL-STD-202, Method 210, (3 sec. at 260°C).
Thermal Shock: MIL-STD-202, Method 107, Test Condition B (−65 to 125°C).
Moisture Resistance: MIL-STD-202, Method 106, High Humidity (90–98 RH), Heat (65°).

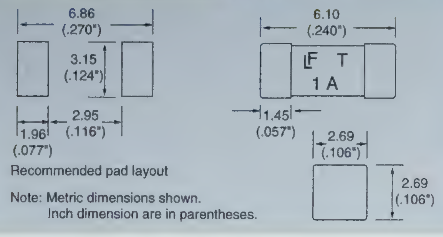
PHYSICAL SPECIFICATIONS:
Materials: Ceramic Body/Tin-Lead Alloy Plated Brass Caps.
Soldering parameters:
Wave solder — 500°F (260°C), 3 seconds, max.
Infrared — 445°F (230°C), 30 seconds, max.
Solderability: MIL-STD-202, Method 208.
Packaging: 12mm Tape on 7 inch reel per EIA Standard 481, and 1000 fuses per reel.
Marking: The **452** 000 series Slo-Blo fuse marking includes the letter "T" to designate time delay characteristics.

PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
R452.375	3/8	125	1.60	0.101
R452.500	1/2	125	0.940	0.240
R452.750	3/4	125	0.460	0.904
R452 001	1	125	0.210	1.98
R452 01.5	1½	125	0.116	3.65
R452 002	2	125	0.0760	8.20
R452 02.5	2½	125	0.0540	15.0
R452 003	3	125	0.0414	20.16
R452 03.5	3½	125	0.0253	26.53
R452 004	4	125	0.0208	34.40
R452 005	5	125	0.0146	53.72


Companion Fuseholder

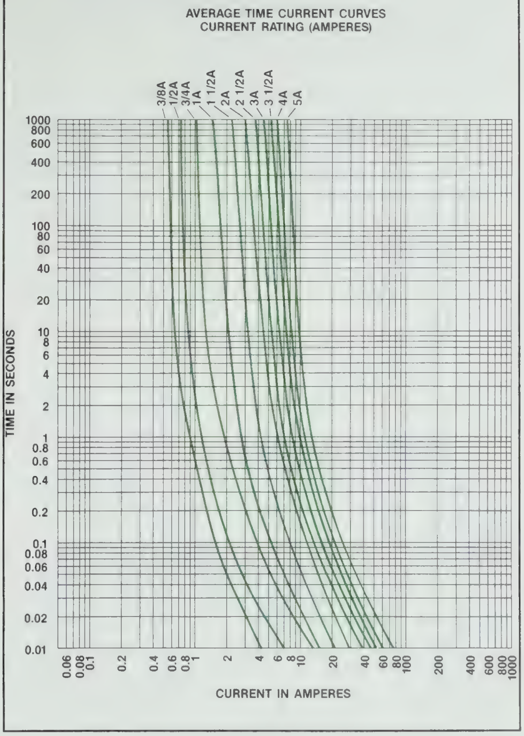


Recommended pad layout

Note: Metric dimensions shown.
Inch dimension are in parentheses.

Refer to pg. 64 for SMF Omni-Blok Holder, Series **154** 000T.

Average Time Current Curves



SUBMINIATURE SURFACE MOUNT

PICO® SMF Very Fast-Acting Type Fuse

The PICO® SMF Very Fast-Acting Fuse provides high performance in a rectangular package suitable for infrared-reflow, vapor phase, and wave soldering methods.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
100%	4 hours, **Min**imum
200%	1 second, **Max**imum
300%	0.1 second, **Max**imum

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:
50 amperes at 125VAC.
300 amperes at 125VDC.

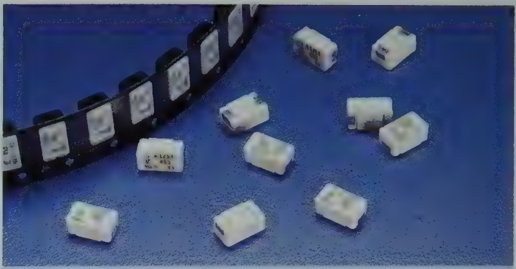
ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: −55°C to 125°C.
Shock: MIL-STD-202, Method 213, Test Condition I (100 G's peak for 6 milliseconds).
Vibration: MIL-STD-202, Method 201 (10–55 Hz, .06 inches total excursion).
Salt Spray: MIL-STD-202, Method 101, Test Condition B (48 hrs.).
Insulation Resistance (After Opening) MIL-STD-202, Method 302 (10,000 ohms minimum at 100 volts).
Resistance to Soldering Heat: MIL-STD-202, Method 210, Test Condition F (10 sec. at 260°C).
Thermal Shock: MIL-STD-202, Method 107, Test Condition B (−65 to 125°C).
Moisture Resistance: MIL-STD-202, Method 106, High Humidity (90–98 RH), Heat (65°C).

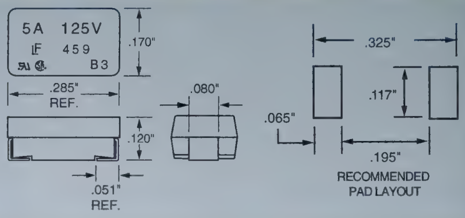
PHYSICAL SPECIFICATIONS:
Materials: Molded thermoplastic body plated copper terminal.
Soldering parameters:
Wave solder — 500°F (260°C), 10 seconds, max.
Infrared — 500°F (260°C), 30 seconds max.
Vapor Phase — 420°F (215°C), 120 seconds max.
Solderability: Mil-STD-202, Method 208.
Packaging: 12mm Tape and Reel per EIA Standard 481. 500 fuses per reel.

PATENTS: Patented.

ORDERING INFORMATION:

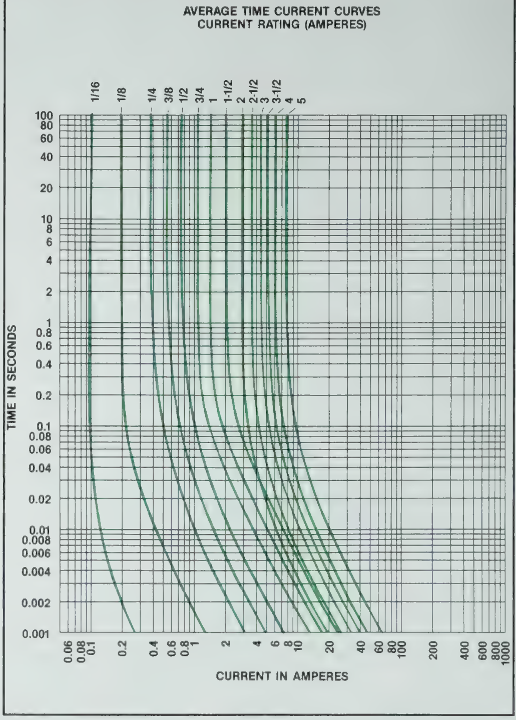
Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
R459.062	1/16	125	7.0	0.000075
R459.125	1/8	125	1.70	0.00163
R459.250	1/4	125	0.665	0.0106
R459.375	3/8	125	0.395	0.0254
R459.500	1/2	125	0.280	0.0546
R459.750	3/4	125	0.175	0.155
R459 001	1	125	0.125	0.281
R459 01.5	1½	125	0.0800	0.650
R459 002	2	125	0.0468	0.421
R459 02.5	2½	125	0.0350	0.721
R459 003	3	125	0.0290	1.23
R459 03.5	3½	125	0.0240	1.65
R459 004	4	125	0.0200	2.35
R459 005	5	125	0.0155	3.90





RECOMMENDED PAD LAYOUT

Average Time Current Curves



SUBMINIATURE SURFACE MOUNT

PICO® SMF Slo-Blo® Type Fuse

The PICO® SMF Slo-Blo® Fuse product provides Pico® fuse reliability and performance in a standard rectangular surface mount package.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
100%	4 hours, **Minimum**
200%	1 second, **Min.:** 120 seconds, **Max.**
300%	0.2 seconds, **Min.:** 3 seconds, **Max.**
800%	0.02 seconds, **Min.:** 0.1 seconds, **Max.**

AGENCY APPROVALS:° Recognized under the Components Program of Underwriters Laboratories and Certified by CSA. Approved by MITI from 1 through 5 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:
50 amperes at 125VAC.
50 amperes at 125VDC.

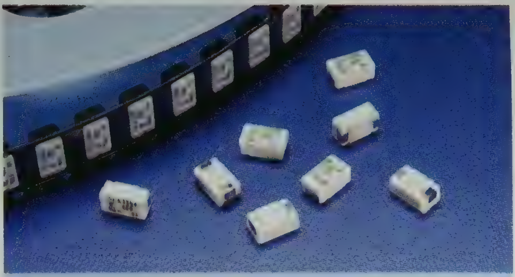
ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: −55°C to 125°C.
Shock: MIL-STD-202, Method 213, Test Condition I (100 G's peak for 6 milliseconds).
Vibration: MIL-STD-202, Method 201 (10−55 Hz,). MIL-STD-202, Method 204, Test Condition C (55−2000 Hz, 10 G's peak).
Salt Spray: MIL-STD-202, Method 101, Test Condition B.
Insulation Resistance (After Opening) MIL-STD-202, Method 302 (10,000 ohms minimum at 100 volts).
Resistance to Soldering Heat: MIL-STD-202, Method 210 (3 sec at 260°C).
Thermal Shock: MIL-STD-202, Method 107 (−65 to 125°C).
Moisture Resistance: MIL-STD-202, Method 106, High Humidity (90−98 RH), Heat (65°C).

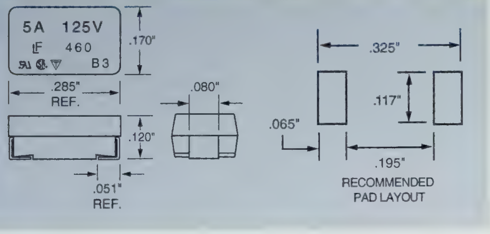
PHYSICAL SPECIFICATIONS:
Materials: Molded thermoplastic body plated copper terminals.
Soldering parameters:
Wave solder — 500°F (260°C), 3 seconds, max.
Infrared — 445°F (230°), 30 seconds, max.
Solderability: Mil-STD-202, Method 208.
Packaging: 12mm Tape and Reel per EIA Standard 481. 500 fuses per reel.

PATENTS: Patented.

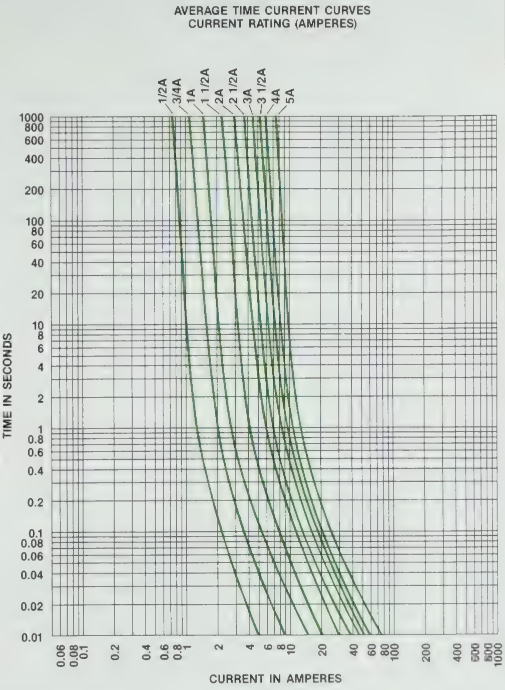
ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
R460.500	1/2	125	1.13	0.210
R460.750	3/4	125	0.500	0.760
R460 001	1	125	0.278	2.01
R460 01.5	1½	125	0.117	3.94
R460 002	2	125	0.0735	7.60
R460 02.5	2½	125	0.0500	13.0
R460 003	3	125	0.0390	21.0
R460 03.5	3½	125	0.0231	26.8
R460 004	4	125	0.0186	35.0
R460 005	5	125	0.0128	54.8





Average Time Current Curves



THIN FILM SURFACE MOUNT

"0603" Very Fast-Acting Thin-Film Type

Super-small size saves valuable board space while providing high power density. Ideal for circuit protection of disk drives, PCMCIA cards and cellular phones.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time at 25°C
100%	4 Hours, Minimum
200%	5 Seconds, Maximum
300%	0.2 Seconds, Maximum

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

AGENCY FILE NUMBERS: UL E10480, CSA LR29862.

INTERRUPTING RATINGS:
35 Amps at 24V AC/DC or
50 Amps at 32V AC/DC

ENVIRONMENTAL SPECIFICATIONS:

Operating Temperature: –55°C to 125°C.

Vibration: Withstands 10-55 HZ per MIL-STD-202F, Method 201A and 10-2000 HZ at 20G's per MIL-STD-202F, Method 204D, Condition D.

Insulation Resistance (After Opening): Greater than 500,000 Ohms.

Resistance To Soldering Heat: Withstands 60 seconds above 200°C up to 260°C, maximum.

Thermal Shock: Withstands 5 cycles of –50°C to 125°C.

PHYSICAL SPECIFICATIONS:

Materials: Epoxy Substrate, Copper/Nickel/Tin-Lead (95/5) Terminations, Conformal Coating

Soldering Parameters:
Wave Solder — 260°C, 10 sec. max.
Infrared Solder— 260°C, 30 sec. max.

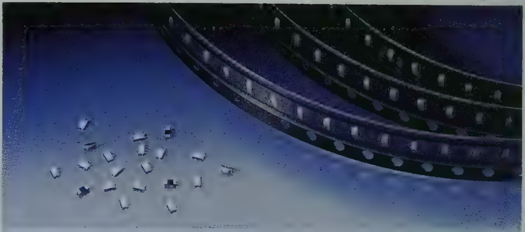
Packaging: 8mm tape and reel per EIA-RS481 (equivalent to IEC 286, part 3), 5,000 fuses per reel.

PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number	Ampere Rating ❶	Voltage Rating	Nominal Resistance Cold Ohms ❷	Nominal Voltage Drop volts ❸
431.500	1/2	32	0.175	0.120
431 001	1	32	0.077	0.100
431 01.5	1½	24	0.043	0.082
431 002	2	24	0.030	0.077

❶ Additional ampere ratings to be released.
❷ Measured at 10% of rated current, 25°C.
❸ Measured at 100% of rated current, 25°C.



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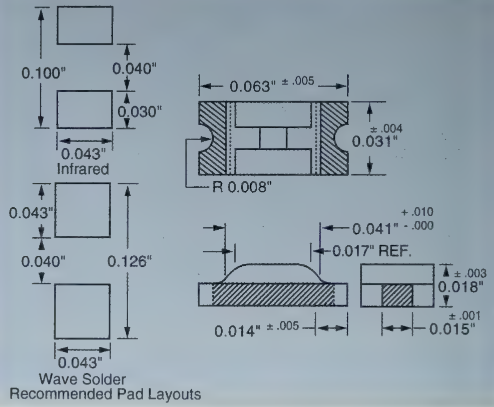
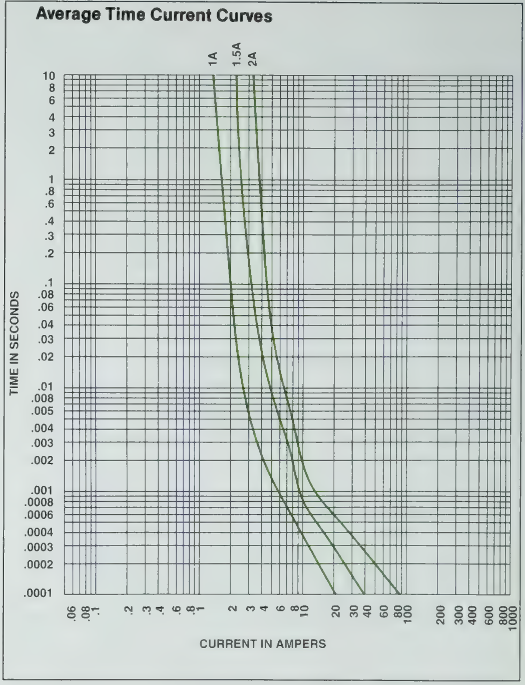




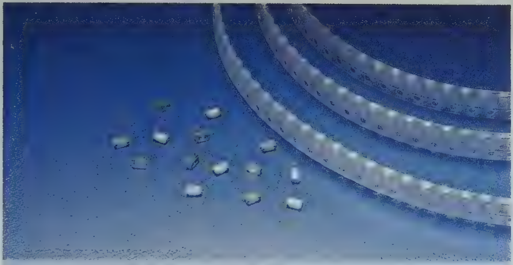
THIN-FILM SURFACE MOUNT

ALF® II SMF Very Fast-Acting Thin-Film Type

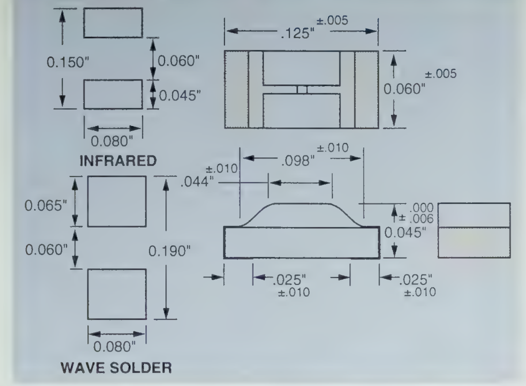
The ALF II SMF is an extremely small, low profile design (1206 chip size) utilizing thin-film technology to achieve precise control of electrical characteristics.

New one-piece element/termination design assures extra reliability by eliminating the need for soldering, welding or other joining operations in the manufacture of the fuse.

Semi-rigid substrate eliminates the potential for thermal shock fractures and decreases the risk of mechanical damage during pick and place operations.



RECOMMENDED PAD LAYOUTS



ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time at 25°C
100%	4 hours, **Min**imum
200%	5 seconds, **Max**imum
300%	0.2 seconds, **Max**imum

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:
50 amperes AC/DC at rated voltage.

ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: −55°C to 125°C.
Vibration: Withstands 10–55 Hz per MIL-STD-202F, Method 201A and 10-2000 Hz at 20 G's per MIL-STD-202F, Method 204D, Condition D.
Insulation Resistance (After Opening) Greater than 20 megohm.
Resistance to Soldering Heat: Withstands 60 seconds above 200°C up to 260°C, maximum.
Thermal Shock: Withstands 5 cycles of −55° to 125°C.

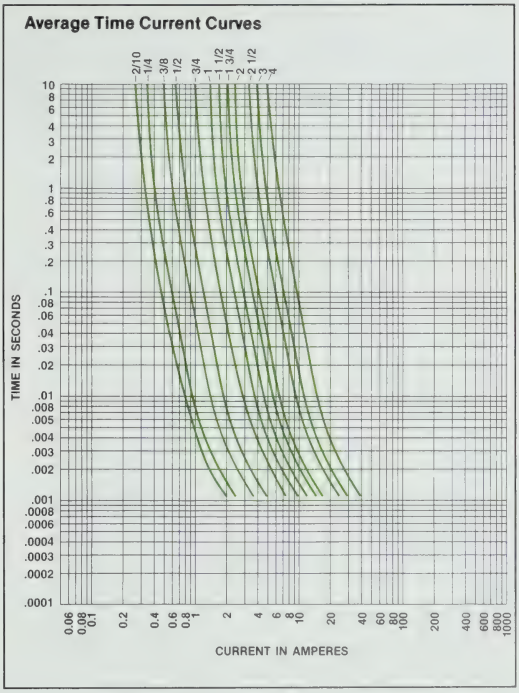
PHYSICAL SPECIFICATIONS:
Materials: Body: Epoxy Substrate
Terminations: Copper/Nickel/Tin-Lead (95/5)
Cover Coat: Conformal Coating
Soldering parameters:
Wave solder — 260°C, 10 seconds maximum
Infrared solder — 260°C, 30 seconds maximum
Packaging: 8mm Tape and Reel per EIA-RS481 (equivalent to IEC 286, part 3); 3000 fuses per reel.

PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms①	Nominal Voltage Drop Volts②	Nominal Melting I²t A² Sec.③
429.125	1/8	125	1.40000	0.200	0.00020
429.200	2/10	125	0.80000	0.175	0.00055
429.250	1/4	125	0.65400	0.160	0.0010
429.375	3/8	125	0.37500	0.138	0.0028
429.500	1/2	63	0.23100	0.130	0.0060
429.750	3/4	63	0.14500	0.120	0.017
429 001	1	63	0.10000	0.115	0.035
429 1.25	1¹/₄	63	0.07475	0.108	0.065
429 01.5	1¹/₂	63	0.06250	0.101	0.125
429 1.75	1³/₄	63	0.05000	0.096	0.150
429 002	2	63	0.04075	0.093	0.230
429 02.5	2¹/₂	32	0.03065	0.087	0.500
429 003	3	32	0.02650	0.080	0.700
429 004	4	24	0.01925	0.070	1.500

① Measured at 10% rated current, 25°C.
② Measured at 100% rated current, 25°C.
③ Measured at rated voltage.


Average Time Current Curves

SUBMINIATURE SURFACE MOUNT

Nanofuse™ Very Fast-Acting Type Fuse

Nanofuse™ has similar electrical performance characteristics to the Pico® fuse and is designed to meet a wide variety of electrical and environmental MIL specifications for more demanding applications.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
100%	1/16–15	4 hours, **Min**imum
200%	1/16–5	1 second, **Max**imum
200%	7–10	5 seconds, **Max**imum
200%	12–15	20 seconds, **Max**imum

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

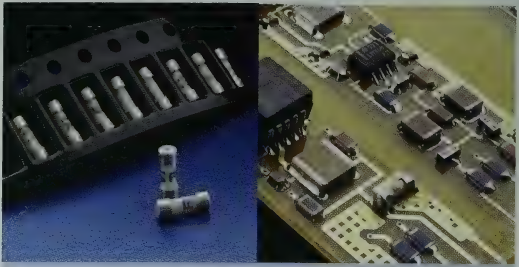
INTERRUPTING RATINGS:
DC: 300 amperes. AC: 50 amperes.

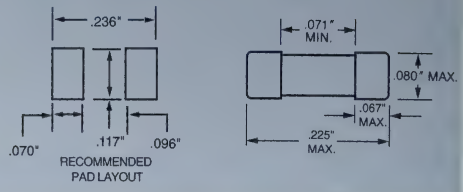
ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: –55°C to 125°C.
Shock: MIL-STD-202, Method 213, Test Condition I (100 G's peak for six (6) milliseconds).
Vibration: MIL-STD-202, Method 201 (10–55 Hz, .06 in. total excursion).
Salt Spray: MIL-STD-202, Method 101, Test Condition B (48 hrs.).
Insulation Resistance (After Opening) MIL-STD-202, Method 302, Test Condition A, (1/2 Megohm minimum).
Resistance to Soldering Heat: MIL-STD-202, Method 210, Test Condition F (20 sec. at 260°C).
Thermal Shock: MIL-STD-202, Method 107, Test Condition B (–65 to 125°C).
Moisture Resistance: MIL-STD-202, Method 106, High Humidity (90–98 RH), Heat (65°).

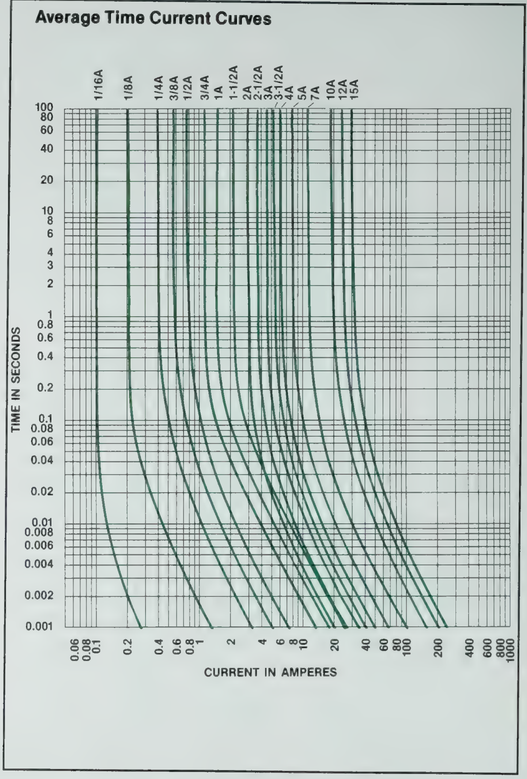
PHYSICAL SPECIFICATIONS:
Materials: Ceramic Body/Plated Brass Caps.
Soldering parameters:
Wave solder — 500°F (260°C), 10 sec.
Infrared — 500°F (260°C), 30 sec.
Packaging: 12mm Tape and Reel per EIA Standard 481. 1000 fuses per reel.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
R271.062	1/16	125	7.0	0.0000750
R271.125	1/8	125	1.75	0.00163
R271.250	1/4	125	0.665	0.0106
R271.375	3/8	125	0.395	0.0254
R271.500	1/2	125	0.304	0.0546
R271.750	3/4	60	0.167	0.155
R271 001	1	60	0.109	0.281
R271 01.5	1½	60	0.0603	0.650
R271 002	2	60	0.0440	0.421
R271 02.5	2½	60	0.0340	0.721
R271 003	3	60	0.0270	1.23
R271 03.5	3½	60	0.0220	1.65
R271 004	4	60	0.0190	2.35
R271 005	5	32	0.0145	3.90
R271 007	7	32	0.0085	10.5
R271 010	10	32	0.0055	24.2
R271 012	12	32	0.0044	45.5
R271 015	15	32	0.0033	70.1






Average Time Current Curves

SUBMINIATURE SURFACE MOUNT & DIP TYPES

FLAT-PAK® and FLAT-PAK® SMF Fuses

Fast-Acting and Slo-Blo® versions of the Flat-Pak Fuse designs are available. Both designs are available in either a gull-wing surface mount package, or a DIP configuration, for through-hole mounting. These fuse designs feature a 250VAC rating in a low profile, rectangular package.

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and certified by CSA.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS: 50 amperes at 250 VAC.

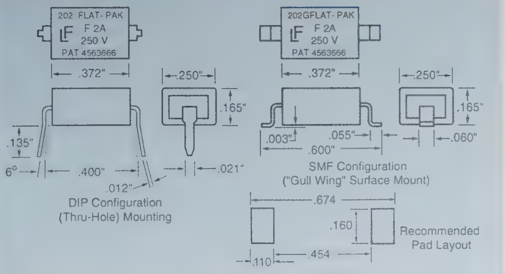
ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: –55°C to 125°C.

PHYSICAL SPECIFICATIONS:
Materials: Thermoplastic Body/Plated Copper Leads.
Flammability Rating: 94V/O.
Soldering parameters:
Wave solder — 500°F (260°C), 3 seconds, maximum.
Infrared — 420°F (215°C), 30 seconds maximum.
Solderability: MIL-STD-202, Method 208.
Cleaning: Board washable in most common solvents.
Packaging:
SMF Fuses — 24mm tape per EIA standard 481.
500 fuses per reel.
DIP Fuses — Antistatic magazine, 100 fuses per magazine.

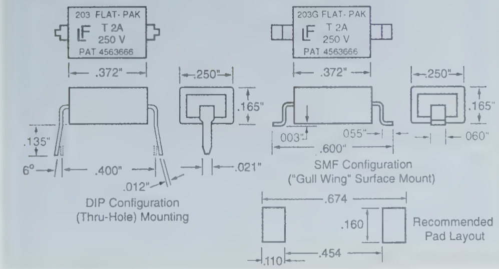
PATENTS: Patented.

REFERENCE DIMENSIONS:

Fast-Acting Type



Slo-Blo® Type



ORDERING INFORMATION:

Fast-Acting Type Fuse

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
100%	4 hours, **Min**imum
200%	2 seconds, **Max**imum

Catalog Number	Catalog❶ Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
202.062	**202**.062G	1/16	250	7.90	0.000220
202.125	**202**.125G	1/8	250	2.45	0.00180
202.250	**202**.250G	1/4	250	0.880	0.0147
202.500	**202**.500G	1/2	250	0.298	0.0363
202.750	**202**.750G	3/4	250	0.166	0.0980
202 001	**202** 001G	1	250	0.119	0.192
202 01.5	**202** 01.5G	1½	250	0.0701	0.540
202 002	**202** 002G	2	250	0.0469	1.07
202 02.5	**202** 02.5G	2½	250	0.0455	1.76
202 003	**202** 003G	3	250	0.0327	1.71
202 004	**202** 004G	4	250	0.0244	3.00
202 005	**202** 005G	5	250	0.0174	4.68

❶SMF fuse marking includes the letter "G" next to the series number indicating "Gulf-Wing"

ORDERING INFORMATION:

Slo-Blo® Type Fuse

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
100%	4 hours, **Min**imum
200%	1 second, **Min**imum
200%	30 seconds, **Max**imum

Catalog Number	Catalog❶ Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
203.250	**203**.250G	1/4	250	1.36	0.0126
203.500	**203**.500G	1/2	250	0.433	0.112
203.750	**203**.750G	3/4	250	0.158	0.327
203 001	**203** 001G	1	250	0.0755	0.328
203 01.5	**203** 01.5G	1½	250	0.0390	0.850
203 002	**203** 002G	2	250	0.0345	1.70
203 02.5	**203** 02.5G	2½	250	0.0237	2.87
203 003	**203** 003G	3	250	0.0197	4.40
203 004	**203** 004G	4	250	0.0148	8.75
203 005	**203** 005G	5	250	0.0124	14.7

❶SMF fuse marking includes the letter "G" next to the series number indicating "Gulf-Wing

SUBMINIATURE

PICO® II Very Fast-Acting Type

ꓤU ⓒ ▽❶ QPL❷

The PICO® II very fast-acting fuse is designed to meet an extensive array of performance characteristics in a space-saving subminiature package.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
100%	1/16–15	4 hours, **Minimum**
200%	1/16–7	1 second **Maximum**
200%	10	3 seconds, **Maximum**
200%	12–15	10 seconds, **Maximum**

AGENCY APPROVALS:❶ Recognized under the Components Program of Underwriters Laboratories and Certified by CSA. Approved by MITI from 1 through 5 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

REFERENCE TO MIL SPEC:❷ Available in Military QPL type FM10, conforming to Mil-F-23419.

INTERRUPTING RATINGS:
300 amperes at 125VDC.
50 amperes at 125VAC.

ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: −55°C to 125°C.
Shock: MIL-STD-202, Method 213, Test Condition I (100 G's peak for 6 milliseconds).
Vibration: MIL-STD-202, Method 201 (10–55 Hz); Method 204, Test Condition C (55–2000 Hz at 10 G's Peak).
Moisture Resistance: MIL-STD-202, Method 106.

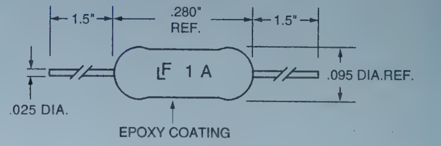
PHYSICAL SPECIFICATIONS:
Materials: Encapsulated, Epoxy-Coated Body; Solder Coated Copper Wire Leads.
Flammability Rating: UL94VO.
Soldering parameters:
Wave solder — 500°F (260°C), 10 seconds, max.
Solderability: MIL-STD-202, Method 208.
Lead Pull Force: MIL-STD-202, Method 211, Test Condition A (will withstand a 7 lb. axial pull test).
Packaging: Fuses packaged per EIA Standard 296. 5000 fuses per reel.
Option: Radial Lead Version; 0.4″ lead spacing; to order change 251 to 252.

PATENTS: Patented.

ORDERING INFORMATION:

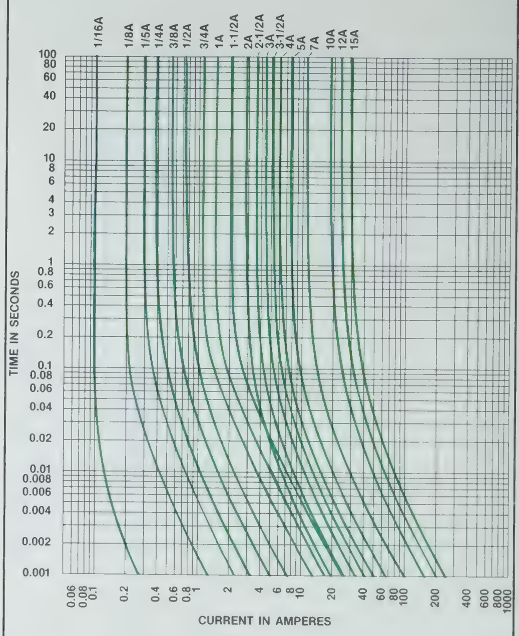
Std. Type Catalog Number	Mil. Type Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
R251.062	R253.062	1/16	125	7.0	0.0000750
R251.125	R253.125	1/8	125	1.70	0.00163
R251.250	R253.250	1/4	125	0.665	0.0106
R251.375	R253.375	3/8	125	0.395	0.0254
R251.500	R253.500	1/2	125	0.280	0.0546
R251.750	R253.750	3/4	125	0.175	0.155
R251 001	R253 001	1	125	0.125	0.281
R251 01.5	R253 01.5	1½	125	0.0800	0.650
R251 002	R253 002	2	125	0.0468	0.421
R251 02.5	R253 02.5	2½	125	0.0350	0.721
R251 003	R253 003	3	125	0.0290	1.23
R251 03.5	R253 03.5	3½	125	0.0240	1.65
R251 004	R253 004	4	125	0.0204	2.35
R251 005	R253 005	5	125	0.0155	3.90
R251 007	R253 007	7	125	0.0105	10.5
R251 010	R253 010	10	125	0.00705	24.2
R251 012	R253 012	12	32	0.00481	45.5
R251 015	R253 015	15	32	0.00395	70.1

251 000 Series
Axial Leads



NOTE: Leads are solder-coated copper, .025″ diameter for 1/16 – 10A, .032″ diameter for 12 – 15A. LF and amperage rating are LASER-MARKED on two sides.

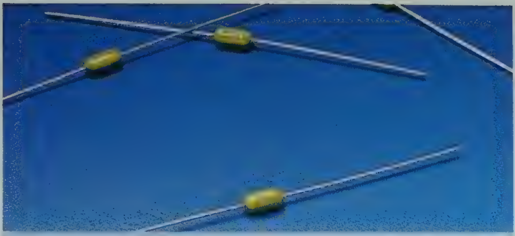
Average Time Current Curves

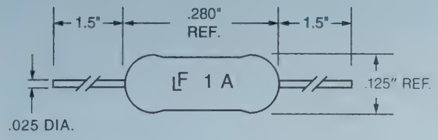


SUBMINIATURE

PICO® II Slo-Blo® Type Fuse

The PICO® II Slo-Blo® fuse combines time delay performance characteristics with the proven reliability of a Picofuse.





ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
100%	4 hours, **Minimum**
200%	1 second, **Min.**: 60 seconds, **Max.**
300%	0.2 seconds, **Min.**: 3 seconds, **Max.**
800%	0.02 seconds, **Min.**: 0.1 seconds, **Max.**

AGENCY APPROVALS:⁰ Recognized under the Components Program of Underwriters Laboratories and Certified by CSA. Approved by MITI from 1 through 5 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:
50 amperes at 125VDC.
50 amperes at 125VAC.

ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: −55°C to 125°C.
Shock: MIL-STD-202, Method 213, Test Condition I (100 G's peak for 6 milliseconds).
Vibration: MIL-STD-202, Method 201 (10–55 Hz); MIL-STD-202, Method 204, Test Condition C (55–2000 Hz at 10 G's Peak).
Salt Spray: MIL-STD-202, Method 101, Test Condition B.
Insulation Resistance (After Opening) MIL-STD-202, Method 302, (10,000 ohms minimum at 100 volts).
Resistance to Soldering Heat: MIL-STD-202, Method 210, Test Condition C (20 sec at 260°C).
Thermal Shock: MIL-STD-202, Method 107, Test Condition B (−65°C to 125°C).
Moisture Resistance: MIL-STD-202, Method 106 (90–98% RH), Heat (65°).

PHYSICAL SPECIFICATIONS:
Materials: Encapsulated, Epoxy-Coated Body; Solder Coated Copper Wire Leads.
Flammability Rating: UL94VO.
Soldering parameters:
Wave solder — 500°F (260°C), 10 seconds, max.

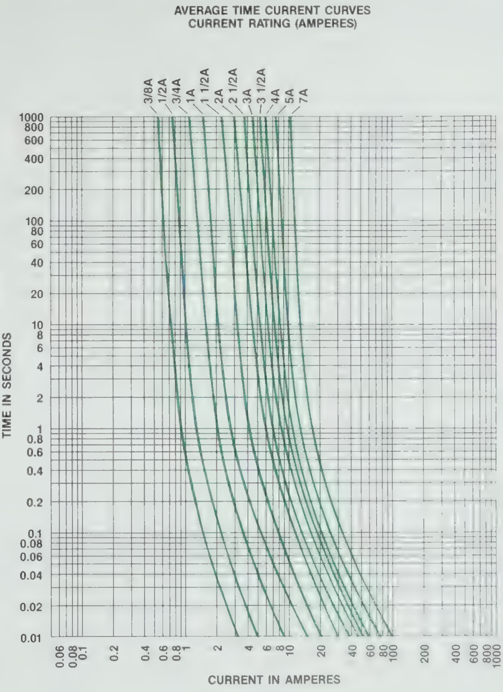
Solderability: MIL-STD-202, Method 208.
Lead Pull Force: MIL-STD-202, Method 211, Test Condition A (will withstand a 10 pound axial pull test).
Packaging: Fuses packaged per EIA Standard 296. 4000 fuses per reel.

PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
473.375	3/8	125	1.74	0.0850
473.500	1/2	125	1.13	0.210
473.750	3/4	125	0.460	0.760
473 001	1	125	0.267	2.01
473 01.5	1½	125	0.117	3.94
473 002	2	125	0.0730	7.60
473 2.25	2¼	125	0.0630	9.28
473 02.5	2½	125	0.0520	13.0
473 003	3	125	0.0380	21.0
473 03.5	3½	125	0.0240	26.8
473 004	4	125	0.0194	35.0
473 005	5	125	0.0133	54.8
473 007	7	125	0.0092	105.0

Average Time Current Curves



SUBMINIATURE

PICO® II 250 Volt Very Fast-Acting Type

The PICO® II 250 Volt product is a specially designed axial leaded fuse that achieves a 250 volt rating in a small package for both domestic and international applications.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
100%	4 hours, **Minimum**
200%	1 second, **Maximum**
300%	0.1 seconds, **Maximum**

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

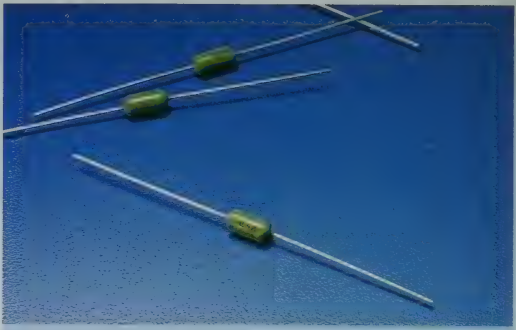
AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

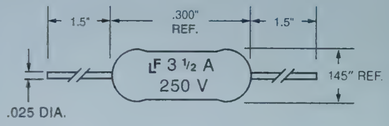
INTERRUPTING RATINGS:
50 amperes at 250VAC.

ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: −55°C to 125°C.
Shock: MIL-STD-202, Method 213, Test Condition 1 (100 G's peak for 6 milliseconds).
Vibration: MIL-STD-202, Method 201 (10−55 Hz); MIL-STD-202, Method 204, Test Condition C (55−2000 Hz at 10 G's Peak).
Salt Spray: MIL-STD-202, Method 101, Test Condition B (48 hrs.).
Insulation Resistance (After Opening) MIL-STD-202, Method 302, Test Condition A (10,000 ohms minimum at 100 volts).
Resistance to Soldering Heat: MIL-STD-202, Method 210, Test Condition C (10 sec. at 260°C).
Thermal Shock: MIL-STD-202, Method 107, Test Condition B (−55°C to 125°C).
Moisture Resistance: MIL-STD-202, Method 106.

PHYSICAL SPECIFICATIONS:
Materials: Encapsulated, Epoxy-Coated Body; Solder Coated Copper Leads.
Flammability Rating: UL94VO.
Soldering parameters:
Wave solder — 500°F (260°C), 10 sec.
Solderability: MIL-STD-202, Method 208.
Lead Pull Force: MIL-STD-202, Method 211, Test Condition A (will withstand 7 pound axial pull test).
Packaging: Tape and Reel per EIA Standard 296. 4000 fuses per reel.

PATENTS: Patented.

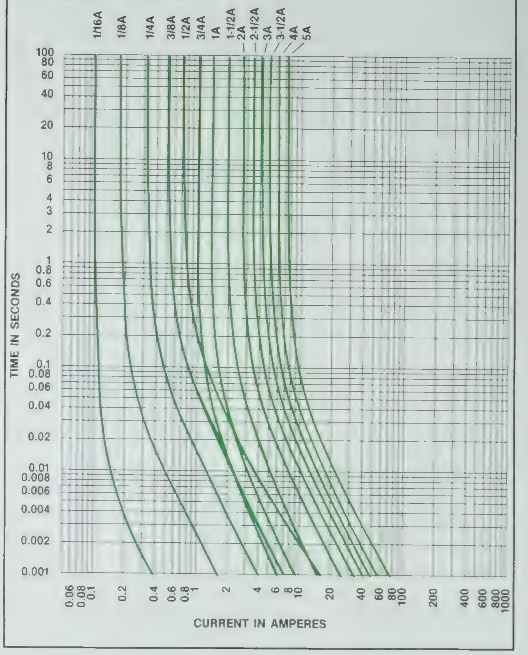




ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
263.062	1/16	250	5.50	0.000192
263.125	1/8	250	1.75	0.00251
263.250	1/4	250	1.2	0.0165
263.375	3/8	250	0.730	0.0444
263.500	1/2	250	0.510	0.1125
263.750	3/4	250	0.300	0.0411
263 001	1	250	0.210	0.087
263 01.5	1½	250	0.0560	0.398
263 002	2	250	0.0420	0.74
263 02.5	2½	250	0.0335	1.197
263 003	3	250	0.0280	1.77
263 03.5	3½	250	0.0238	2.33
263 004	4	250	0.0210	3.08
263 005	5	250	0.0180	5.55

Average Time Current Curves



SUBMINIATURE

Microfuse Very Fast-Acting Type

Ⓢ ᴙU QPL°

Developed originally for the U.S. Space Program, Microfuse provides reliability in an extra compact design. The Microfuse is available in plug in or radial lead styles and a complete range of ampere ratings from 1/500 to 5 amperes to suit a wide variety of design needs.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
100%	1/500–5	4 hours, **Min**imum
200%	1/500–3/10	5 seconds, **Max**imum
200%	4/10–5	2 seconds, **Max**imum

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

INTERRUPTING RATINGS:
10,000 amperes at 125VAC.
10,000 amperes at 125VDC.

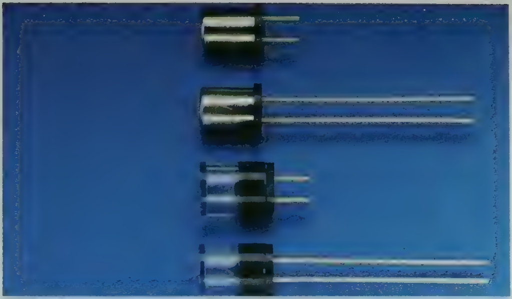
FUSES TO MIL SPEC:° 273 Series is available in Military Q.P.L. type (FM02). To order change **273** to **274**.

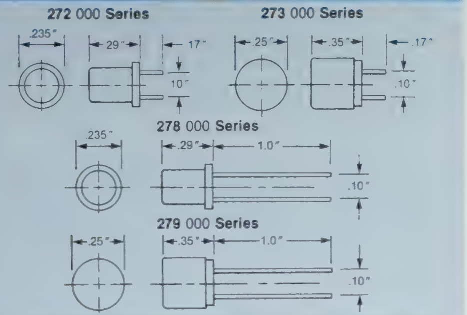
Operating Temperature:
273 and **279:** −55°C to 85°C.
272 and **278:** −55°C to 125°C.

PATENTS: Patented.

ORDERING INFORMATION:

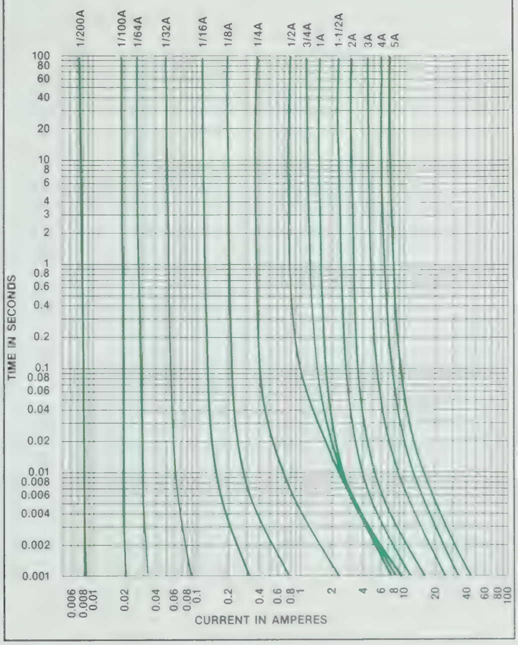
Plug-In		Radial Lead				Nominal	Nominal
Catalog Number	Catalog Number	Catalog Number	Catalog Number	Ampere Rating	Voltage Rating	Resistance Cold Ohms	Melting I²t A² Sec.
272.002	**273**.002	**278**.002	**279**.002	1/500	125	2200	0.00000000845
272.005	**273**.005	**278**.005	**279**.005	1/200	125	280	0.0000000810
272.010	**273**.010	**278**.010	**279**.010	1/100	125	80.0	0.000000462
272.015	**273**.015	**278**.015	**279**.015	1/64	125	44.0	0.00000123
272.031	**273**.031	**278**.031	**279**.031	1/32	125	16.0	0.00000810
272.050	**273**.050	**278**.050	**279**.050	1/20	125	3.20	0.0000666
272.062	**273**.062	**278**.062	**279**.062	1/16	125	2.32	0.000115
272.100	**273**.100	**278**.100	**279**.100	1/10	125	1.25	0.000385
272.125	**273**.125	**278**.125	**279**.125	1/8	125	1.0	0.000691
272.200	**273**.200	**278**.200	**279**.200	2/10	125	2.30	0.00409
272.250	**273**.250	**278**.250	**279**.250	1/4	125	1.75	0.00640
272.300	**273**.300	**278**.300	**279**.300	3/10	125	1.25	0.00945
272.400	**273**.400	**278**.400	**279** 400	4/10	125	0.227	0.0251
272.500	**273**.500	**278**.500	**279**.500	1/2	125	0.167	0.0716
272.600	**273**.600	**278**.600	**279**.600	6/10	125	0.430	0.0411
272.700	**273**.700	**278**.700	**279**.700	7/10	125	0.324	0.0710
272.750	**273**.750	**278**.750	**279**.750	3/4	125	0.282	0.0900
272.800	**273**.800	**278**.800	**279**.800	8/10	125	0.258	0.113
272 001	**273** 001	**278** 001	**279** 001	1	125	0.0880	0.0648
272 01.5	**273** 01.5	**278** 01.5	**279** 01.5	1½	125	0.0578	0.160
272 002	**273** 002	**278** 002	**279** 002	2	125	0.0425	0.300
272 003	**273** 003	**278** 003	**279** 003	3	125	0.0275	0.759
272 004	**273** 004	**278** 004	**279** 004	4	125	0.0202	1.38
272 005	**273** 005	**278** 005	**279** 005	5	125	0.0160	2.21





NOTE: Amperage and voltage rating stamped on cap. Leads are solder-coated copper; .025″ diameter.

Average Time Current Curves



HIGH-RELIABILITY SUBMINIATURE

Pico® Fuse Very Fast-Acting Type Fuse QPL°

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
100%	1/16–15	4 hours, **Min**imum
200%	1/16–7	1 second, **Max**imum
200%	10	3 seconds, **Max**imum
200%	15	10 seconds, **Max**imum

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

FUSES TO MIL SPEC:°265 Series (except 1/16 ampere rating) is available in Military QPL Type (FM08A), conforming to MIL-F-23419/8. To order, change **265** to **267**.

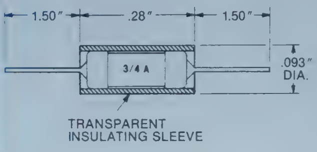
OPTIONS: Special screening tests, burn-in, etc. can be supplied on special order to meet specific requirements. For information on higher current ratings, contact factory.

TIME CURRENT CURVE: Refer to factory.

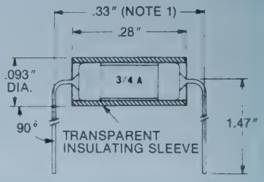
ORDERING INFORMATION:

Axial Lead Catalog Number	Radial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms
265.062	**266**.062	1/16	125	7.0
265.125	**266**.125	1/8	125	2.1
265.250	**266**.250	1/4	125	0.71
265.375	**266**.375	3/8	125	0.42
265.500	**266**.500	1/2	125	0.28
265.750	**266**.750	3/4	125	0.17
265 001	**266** 001	1	125	0.125
265 01.5	**266** 01.5	1½	125	0.08
265 002	**266** 002	2	125	0.055
265 02.5	**266** 02.5	2½	125	0.042
265 003	**266** 003	3	125	0.03515
265 004	**266** 004	4	125	0.023
265 005	**266** 005	5	125	0.014
265 007	**266** 007	7	125	0.01
265 010	**266** 010	10	125	0.00645
265 015	**266** 015	15	32	0.004

265 000 **Series**



266 000 **Series**



NOTE 1: .36″ for 15 amp rating.

MATERIAL, ELECTRICAL AND ENVIRONMENTAL SPECIFICATIONS (265, 266, 267 Series)

LEADS	1/16 to 10 amperes = .025″ dia.; 15 amperes = .032″ dia.; gold-plated copper per MIL-G-45204, Type II
WEIGHT	.32 Grams
INTERRUPTING RATINGS	300 amperes at rated voltage DC 50 amperes at rated voltage AC
SHOCK	MIL-STD-202, Method 213, Test Condition I, 100 G's peak for 6 milliseconds
VIBRATION	MIL-STD-202, Method 201, 10–55 Hz MIL-STD-202, Method 204, Test Condition C, 55–2000 Hz (10 G's peak)
MOISTURE RESISTANCE	MIL-STD-202, Method 106
SEAL TEST	MIL-STD-202, Method 112, Test Condition A
SALT SPRAY	MIL-STD-202, Method 101, Test Condition B
THERMAL SHOCK	MIL-STD-202, Method 107, Test Condition B (−65 °C to 125 °C)
INSULATION RESISTANCE (after opening)	MIL-STD-202, Method 302, Test Condition A (1/2 Megohm Minimum)
OPERATING TEMPERATURE RANGE	−55° to 125 °C
CURRENT CARRYING CAPACITY	−55° is 110% of Rating; 25° is 100% of Rating; and 125° is 80% of Rating
LEAD PULL TEST	MIL-STD-202, Method 211, Test Condition A (will withstand a five pound axial pull test)
AQL (ELECTRICAL CHARACTERISTICS)	Certified to 1% AQL
SAMPLING	Per MIL-STD-105, inspection level II
TRACEABILITY AND IDENTIFICATION RECORDS	Controlled by lot number and retained on file for a minimum of three years. Copies of Lot Certification test data available when requested with order.

NOTE: The specifications for High-Reliability Picofuses, which are shown in screened area, are the same as for High-Reliability Microfuses.

HIGH-RELIABILITY SUBMINIATURE

Microfuse Very Fast-Acting Type

UL CSA QPL°

ELECTRICAL CHARACTERISTICS:

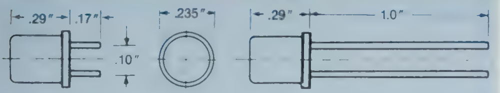
% of Ampere Rating	Ampere Rating	Opening Time
100%	1/500–5	4 hours, **Min**imum
200%	1/500–3/10	5 seconds, **Max**imum
200%	4/10–5	2 seconds, **Max**imum

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

FUSES TO MIL SPEC:°262 Series is available in Military QPL Type (FM07A), conforming to MIL-F-23419/7. To order, change **262** to **269**.

OPTIONS: Special screening tests, burn-in, etc. can be supplied on special order to meet specific requirements.

PATENTS: Patented.



262 000 **Series** **268** 000 **Series**

ORDERING INFORMATION:

Plug-in Catalog Number	Radial Lead Catalog Number	Amperre Rating	Voltage Rating	Nominal Resistance Cold Ohms
262.002	**268**.002	1/500	125	2000
262.005	**268**.005	1/200	125	280
262.010	**268**.010	1/100	125	94.0
262.015	**268**.015	1/64	125	44.0
262.031	**268**.031	1/32	125	16.45
262.050	**268**.050	1/20	125	3.20
262.062	**268**.062	1/16	125	2.25
262.100	**268**.100	1/10	125	1.17
262.125	**268**.125	1/8	125	1.0
262.200	**268**.200	2/10	125	2.30
262.250	**268**.250	1/4	125	1.75
262.300	**268**.300	3/10	125	1.25
262.400	**268**.400	4/10	125	0.227
262.500	**268**.500	1/2	125	0.167
262.600	**268**.600	6/10	125	0.140
262.700	**268**.700	7/10	125	0.114
262.750	**268**.750	3/4	125	0.104
262.800	**268**.800	8/10	125	0.094
262 001	**268** 001	1	125	0.100
262 01.5	**268** 01.5	1½	125	0.063
262 002	**268** 002	2	125	0.046
262 003	**268** 003	3	125	0.034
262 004	**268** 004	4	125	0.019
262 005	**268** 005	5	125	0.018

TIME CURRENT CURVE: Refer to factory.

MATERIAL, ELECTRICAL AND ENVIRONMENTAL SPECIFICATIONS (262, 268, 269 Series)

LEADS	.025″ dia., gold plated copper per MIL-G-45204, Type II, Fuse Cap is also gold plated
WEIGHT	262 and 269 Series .36 Grams, 268 Series .48 Grams
INTERRUPTING RATINGS	10,000 amperes at 125VAC 10,000 amperes at 125VDC
SHOCK	1/500 ampere: MIL-STD-202, Method 213, Test Condition A, 50 G's peak for 11 milliseconds 1/200 thru 5 amperes: MIL-STD-202, Method 213, Test Condition 1, 100 G's peak for 6 milliseconds
VIBRATION	MIL-STD-202, Method 201, 10–55 Hz MIL-STD-202, Method 204, Test Condition C, 55–2000 Hz (10 G's peak)
MOISTURE RESISTANCE	MIL-STD-202, Method 106
SEAL TEST	MIL-STD-202, Method 112, Test Condition A
SALT SPRAY	MIL-STD-202, Method 101, Test Condition B
THERMAL SHOCK	MIL-STD-202, Method 107, Test Condition B (−65°C to 125°C)
INSULATION RESISTANCE (after opening)	MIL-STD-202, Method 302, Test Condition A (1/2 Megohm Minimum)
OPERATING TEMPERATURE RANGE	−55° to 125°C
CURRENT CARRYING CAPACITY	−55° is 110% of Rating; 25° is 100% of Rating; and 125° is 80% of Rating
LEAD PULL TEST	MIL-STD-202, Method 211, Test Condition A (will withstand a five pound axial pull test)
AQL (ELECTRICAL CHARACTERISTICS)	Certified to 1% AQL
SAMPLING	Per MIL-STD-105, inspection level II
TRACEABILITY AND IDENTIFICATION RECORDS	Controlled by lot number and retained on file for a minimum of three years Copies of Lot Certification test data available when requested with order

NOTE: The specifications for High-Reliability Microfuses, which are shown in screened area, are the same as for High-Reliability Picofuses

SUBMINIATURE GLASS BODY

2AG Fast-Acting Type

① MIL②

The 2AG Fast-Acting fuses are available in cartridge form or with axial leads. Axial leaded fuses are board washable. 2AG fuses provide the same performance characteristics as their 3AG counterpart, while occupying one-third the space. Sleeved fuses are available.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Min**imum
135%	1 hour, **Max**imum
200%	1 second, **Max**imum

AGENCY APPROVALS: ① Listed by Underwriters Laboratories and certified by CSA. **224** 004 and **224** 005 approved by MITI.
AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

FUSES TO MIL SPEC: ② **224** and **225 Series** 1/8 through 7 amperes are available to DESC Drawing #87108. To order change **224** to **289** or **225** to **288**.

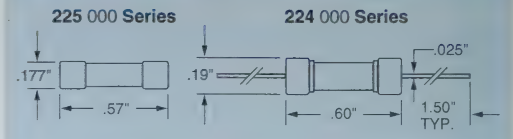
INTERRUPTING RATINGS:
10,000 amperes at 125VAC (0.1 – 10A)
35 amperes at 250VAC (0.1 – 1A)
100 amperes at 250VAC (1.5 – 3.5A)

OPTIONS: 224 Series available on tape and reel.

PATENTS: Patented.

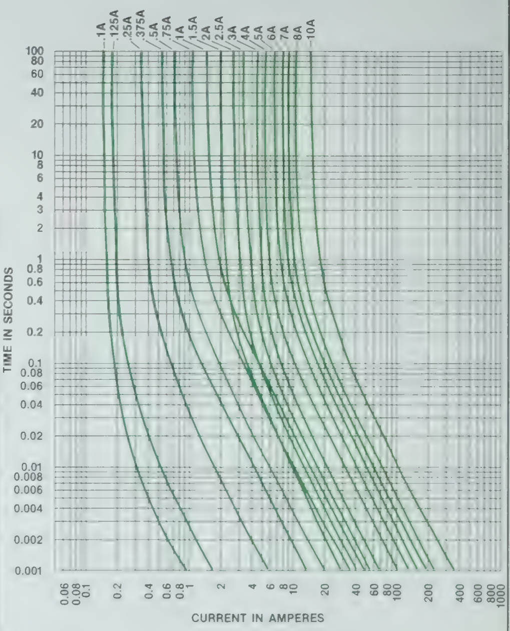
ORDERING INFORMATION:

Cartridge Catalog Number	Axial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I^2t A^2 Sec.
225.100	**224**.100	1/10	250	6.15	0.000750
225.125	**224**.125	1/8	250	3.90	0.00286
225.250	**224**.250	1/4	250	1.15	0.0300
225.375	**224**.375	3/8	250	0.395	0.171
225.500	**224**.500	1/2	250	0.265	0.365
225.750	**224**.750	3/4	250	0.152	1.05
225 001	**224** 001	1	250	0.102	2.22
225 01.5	**224** 01.5	1½	250	0.0705	0.800
225 002	**224** 002	2	250	0.0490	1.50
225 02.5	**224** 02.5	2½	250	0.0365	2.68
225 003	**224** 003	3	250	0.0310	4.62
225 03.5	**224** 03.5	3½	250	0.0258	6.70
225 004	**224** 004	4	125	0.0233	9.40
225 005	**224** 005	5	125	0.0179	17.00
225 006	**224** 006	6	125	0.0147	22.1
225 007	**224** 007	7	125	0.0123	40.0
225 008	**224** 008	8	125	0.0100	56.0
225 010	**224** 010	10	125	0.00675	116.0



Axial Lead Material: Solder coated copper.

Average Time Current Curves



2AG Special 350V

Fast-Acting Type

The **220007** subminiature fuse is intended for flourescent lighting ballast protection or similar applications up to 350V.

AXIAL LEAD PART NUMBER: 220007 (ampere rating of 3A).

DIMENSIONS: Same as **224 Series**.

ELECTRICAL CHARACTERISTICS: Same as **224 Series.**

INTERRUPTING RATING: 100 amperes at 350VAC.

PATENTS: Patented.
Contact factory concerning other ampere ratings.

SUBMINIATURE GLASS BODY

2AG Slo-Blo® Type Fuse

Ⓤ° Ⓢ° Я° ▽° MIL°

The 2AG Slo-Blo® fuses are available in cartridge form or with axial leads. Axial leaded fuses are board washable. 2AG fuses provide the same performance characteristics as their 3AG counterpart, while occupying one-third the space. Sleeved fuses are available.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Minimum**
135%	1 hour, **Maximum**
200%	3 seconds, **Minimum**/20 seconds, **Maximum**

AGENCY APPROVALS: ⁰Listed by Underwriters Laboratories and Certified by CSA through 3.5 amperes. Recognized under the Components Program of Underwriters Laboratories from 4 through 7 amperes. **229** 004 and **229** 005 approved by MITI. **230** 001 through **230** 005 approved by MITI.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

FUSES TO MIL SPEC: ⁰**229** and **230 Series** are available to DESC Drawing #87108. To order change **229** to **290** or **230** to **291**.

INTERRUPTING RATINGS:
10,000 amperes at 125VAC (0.25–3.5A)
400 amperes at 125VAC (4–7A)
35 amperes at 250VAC (0.25–1A)
100 amperes at 250VAC (1.25–3.5A)

OPTIONS: 230 Series available on tape and reel.

PATENTS: Patented.

ORDERING INFORMATION:

Cartridge Catalog Number	Axial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
229.250	**230**.250	1/4	250	2.41	0.216
229.350	**230**.350	.350	250	1.24	0.490
229.375	**230**.375	3/8	250	1.16	0.550
229.500	**230**.500	1/2	250	0.688	1.16
229.600	**230**.600	6/10	250	0.477	1.75
229.750	**230**.750	3/4	250	0.340	2.95
229.800	**230**.800	8/10	250	0.304	3.45
229 001	**230** 001	1	250	0.206	5.64
229 1.25	**230** 1.25	1¼	250	0.145	9.80
229 01.5	**230** 01.5	1½	250	0.107	15.0
229 002	**230** 002	2	250	0.0692	30.0
229 2.25	**230** 2.25	2¼	250	0.0562	39.0
229 02.5	**230** 02.5	2½	250	0.0498	50.0
229 003	**230** 003	3	250	0.0380	77.0
229 03.5	**230** 03.5	3½	250	0.0310	110.0
229 004	**230** 004	4	125	0.0256	148.0
229 005	**230** 005	5	125	0.0185	267.0
229 006	**230** 006	6	125	0.0140	380.0
229 007	**230** 007	7	125	0.0115	464.0

2AG Special Surge Withstand

Slo-Blo® Type Ⓤ Ⓢ

AXIAL LEAD PART NUMBER: 220003 (0.35A)

ELECTRICAL CHARACTERISTICS:

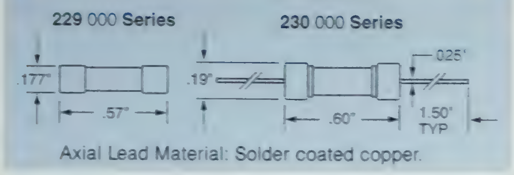
Amperes	Opening Time
0.35A	4 hours, **Minimum**
0.6A	90 seconds, **Maximum**
2.0A	2 seconds, **Maximum**
6.0A	0.5 seconds, **Maximum**

INTERRUPTING RATING: Same as **230 Series**.

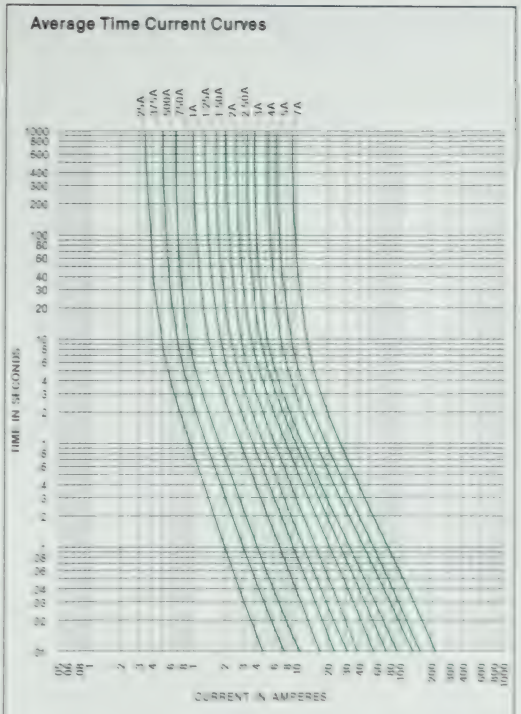
LIGHTNING SURGE WITHSTAND CAPABILITY: 25 amperes peak, 800V, 10 × 560 microseconds.

PATENTS: Patented.

Refer to page 27 for other Surge Withstand Fuses.



Axial Lead Material: Solder coated copper.



SUBMINIATURE GLASS BODY

2AG Indicating Slo-Blo® Type Fuse

The 2AG Indicating Slo-Blo® type fuse instantly identifies itself upon opening by showing a discoloration of its glass body. Guesswork and time consuming circuit testing are eliminated. This unique design offers the same quality performance characteristics as the standard 2AG fuse design.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Minimum**
135%	1 hour, **Maximum**
200%	3 seconds, **Minimum**
200%	20 seconds, **Maximum**

AGENCY APPROVALS: Listed by Underwriters Laboratories and certified by CSA through 3.5 amperes. Recognized under the Components Program of Underwriters Laboratories from 4 through 7 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:
10,000 amperes at 125VAC (0.25–3.5A)
400 amperes at 125VAC (4–7A)
35 amperes at 250VAC (0.25–1A)
100 amperes at 250VAC (1.25–3.5A)

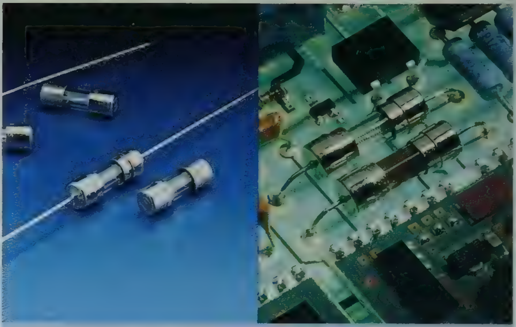
Packaging:

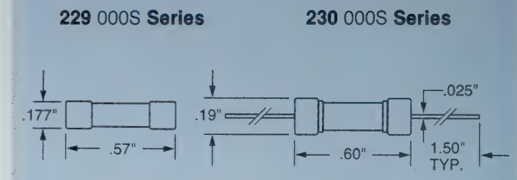
Tape and Reel — Fuses packaged per EIA 296. To order 2.062″ (52.47mm) spacing, add the prefix "R" and suffix "T1". 1500 fuses per reel.

PATENTS: Patented.

ORDERING INFORMATION:

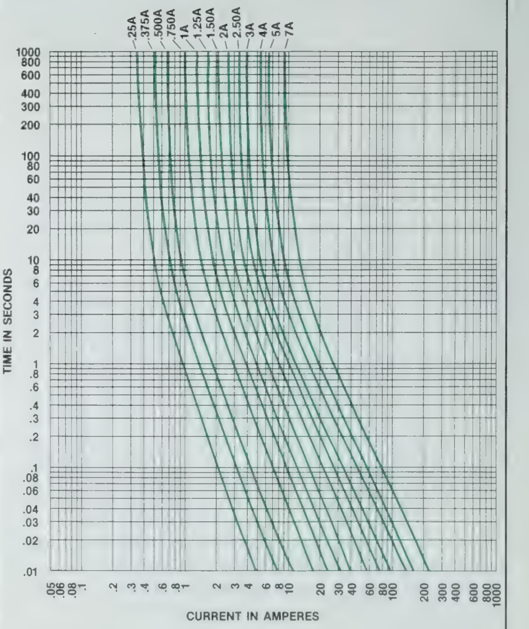
Cartridge Catalog Number	Axial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
229.250S	230.250S	1/4	250	2.41	0.216
229.350S	230.350S	.350	250	1.24	0.490
229.375S	230.375S	3/8	250	1.16	0.580
229.500S	230.500S	1/2	250	0.688	1.16
229.600S	230.600S	6/10	250	0.477	1.75
229.750S	230.750S	3/4	250	0.340	2.95
229.800S	230.800S	8/10	250	0.304	3.45
229 001S	230 001S	1	250	0.206	5.64
229 1.25S	230 1.25S	1¼	250	0.145	9.80
229 01.5S	230 01.5S	1½	250	0.107	15.0
229 002S	230 002S	2	250	0.0692	30.0
229 2.25S	230 2.25S	2¼	250	0.0562	39.0
229 02.5S	230 02.5S	2½	250	0.0498	50.0
229 003S	230 003S	3	250	0.0380	77.0
229 03.5S	230 03.5S	3½	250	0.0310	110.0
229 004S	230 004S	4	125	0.0256	148.0
229 005S	230 005S	5	125	0.0185	267.0
229 006S	230 006S	6	125	0.0140	380.0
229 007S	230 007S	7	125	0.0115	464.0





Axial Lead Material: Solder coated copper.

Average Time Current Curves



SUBMINIATURE GLASS BODY

2AG Surge Withstand Type

2AG Surge Withstand Fuse combines conventional over-current protection with the abiility to withstand high current, short duration pulses. These fuses comply with the short circuit requirements of UL 1459 for telephone equipment. Insulating Sleeve Option available.

ELECTRICAL CHARACTERISTICS:

Short Circuit Capabilities:
U.L. 1459: 40A, 600VAC
7A, 600VAC
2.2A, 600VAC

% of Ampere Rating	Opening Time
110%	4 hours, **Min**imum
135%	1 hour, **Max**imum
200%	3 seconds, **Min**imum
200%	20 seconds, **Max**imum

AGENCY APPROVALS: Listed by Underwriters Laboratories and Certified by CSA.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:
10,000 amperes at 125VAC (1/4A – 1¼A).
35 amperes at 250VAC (1/4A – 1A).
100 amperes at 250VAC (1¼A).

PHYSICAL SPECIFICATIONS:
Materials: Glass Body, Nickel-Plated Brass Fuse Caps.
Soldering parameters:
Wave solder — 500°F (260°C), 3 seconds, Max.
Infrared — Not recommended.
Solderability: (Axial Leaded Fuses): MIL-STD-202, Method 208.
Packaging:
230 Axial Series: 1500 fuses per reel to EIA 296. To order, add the prefix "R" and the suffix "T1" for 2.062" (52.4mm) taped spacing. Insulating sleeve option available.

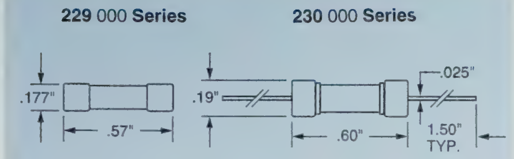
PATENTS: Patented.

TIME-CURRENT CURVES: See Page 25, Slo-Blo®, 2AG.

ORDERING INFORMATION:

Cartridge Catalog Number	Axial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
229.250	230.250	1/4	250	2.410	0.216
229.350	230.350	35/100	250	1.240	0.490
229.375	230.375	3/8	250	1.160	0.580
229.500	230.500	1/2	250	0.688	1.16
229.600	230.600	6/10	250	0.477	1.75
229.750	230.750	3/4	250	0.340	2.95
229.800	230.800	8/10	250	0.304	3.45
229 001	230 001	1	250	0.206	5.64
229 1.25	230 1.25	1¼	250	0.145	9.80

NOTE: LF logo, series number, amperage rating, voltage rating, and U.L. and CSA logos are stamped on the fuse caps.



Axial Lead Material: Solder coated copper.

ENVIRONMENTAL SPECIFICATIONS:
Operating Temperature: −55°C to 125°C.
Shock: MIL-STD-202, Method 213, Test Condition 1 (100 G's peak for 6 ms).
Vibration: MIL-STD-202, Method 201 (10–55 Hz, 0.06 inches total excursion).
Salt Spray: MIL-STD-202, Method 101, Test Condition B (48 hours).
Insulation Resistance (After Opening): MIL-STD-202, Method 302, Test Condition B.
Resistance To Soldering Heat: (Axial Leaded Fuses): MIL-STD-202, Method 210A, Test Condition B (260°C, 3 Seconds).
Thermal Shock: MIL-STD-202, Method 107, Test Condition B (−65°C to +125°C).
Moisture Resistance: MIL-STD-202, Method 106 (90–98% RH, 65°C).

PEAK WITHSTAND CURRENT (Ip): These fuses will withstand 50 repetitions of a double exponential impulse wave having peak currents (Ip) and peak voltages as listed.

Amperage Rating	10 × 560 microsec. 800V	10 × 1000 microsec. 1000V
1/4	16.6A	12.4A
35/100	25.8A	19.3A
3/8	25.4A	19.0A
1/2	37.7A	28.2A
55/100	48.7A	36.5A
6/10	47.2A	35.3A
3/4	65.5A	49.0A
8/10	68.9A	51.6A
1	88.6A	66.3A
1¼[1]	118.1A	100.0A

[1] 500A peak, 2500V, 2 x 10 microseconds, 20 repetitions

GLASS BODY

3AG Fast-Acting Type

QPL°

A standard for cost-effective reliability and performance in circuit protection, the 3AG Fuse satisfies a broad range of application requirements.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Minimum**
135%	1 hour, **Maximum**
200%	5 seconds, **Maximum**

AGENCY APPROVALS: Listed by Underwriters Laboratories and Certified by CSA.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

FUSES TO MIL SPEC:° See F02A cartridge type in Military Section.

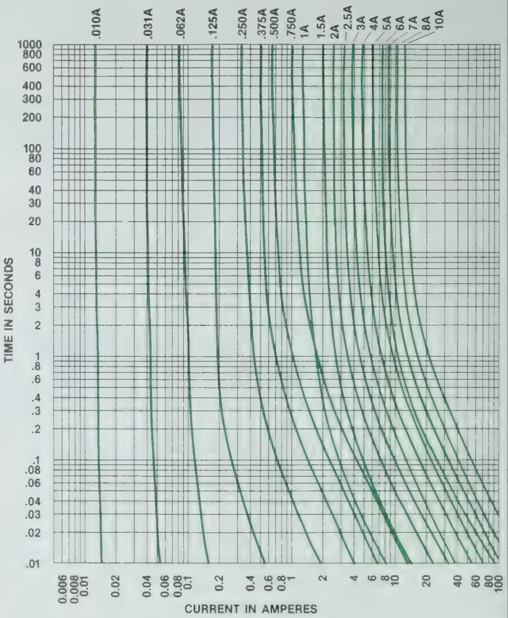
ORDERING INFORMATION:

Cartridge Catalog Number	Axial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
312.010	318.010	1/100	250	175	0.00000225
312.031	318.031	1/32	250	23.3	0.0000300
312.062	318.062	1/16	250	24.5	0.000249
312.100	318.100	1/10	250	11.2	0.00102
312.125	318.125	1/8	250	7.10	0.00289
312.150	318.150	15/100	250	5.10	0.00550
312.175	318.175	.175	250	3.85	0.00960
312.187	318.187	3/16	250	3.40	0.0128
312.200	318.200	2/10	250	3.00	0.0165
312.250	318.250	1/4	250	2.00	0.0355
312.300	318.300	3/10	250	1.40	0.0689
312.375	318.375	3/8	250	0.820	0.185
312.500	318.500	1/2	250	0.495	0.483
312.600	318.600	6/10	250	0.360	0.880
312.750	318.750	3/4	250	0.243	1.84
312 001	318 001	1	250	0.189	0.760
312 01.25	318 01.25	1¼	250	0.138	1.45
312 01.5	318 01.5	1½	250	0.103	2.35
312 01.6	318 01.6	1 6/10	250	0.0930	2.80
312 1.75	318 1.75	1¾	250	0.0850	3.60
312 01.8	318 01.8	1 8/10	250	0.0820	3.85
312 002	318 002	2	250	0.0700	5.20
312 2.25	318 2.25	2¼	250	0.0590	7.20
312 02.5	318 02.5	2½	250	0.0510	9.54
312 003	318 003	3	250	0.0424	14.0
312 004	318 004	4	250	0.0291	28.5
312 005	318 005	5	250	0.0223	50.0
312 006	318 006	6	250	0.0177	81.1
312 007	318 007	7	250	0.0145	118.0
312 008	318 008	8	250	0.0121	166.0
312 010	318 010	10	250	0.00925	298.0
312 012	—	12	32	0.0071	—
312 015	—	15	32	0.0052	—
312 020	—	20	32	0.0034	—
312 025	—	25	32	0.0024	—
312 030	—	30	32	0.0019	—
312 035	—	35	32	0.0013	—

312 000 **SERIES FUSE DIMENSIONS:**
Diameter: ¼″; Length: 1¼″.

318 000 **SERIES FUSE DIMENSIONS:**
Diameter: .275", Length 1.275"
Lead Diameter: .032"
Lead Length: 1.5"
Lead Material: Solder coated copper.

Average Time Current Curves



GLASS BODY

3AG Slo-Blo® Type Fuse

QPL②

A standard for cost effective reliability and performance in circuit protection, the 3AG fuse satisfies a broad range of application requirements.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Min**imum
135%	1 hour, **Max**imum
200%	5 seconds, **Min**imum

AGENCY APPROVALS:① Listed by Underwriters Laboratories. Certified by CSA through 8 amperes. **313** 000 Series approved by MITI from 1 through 5 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

FUSES TO MIL SPEC:② See F02B cartridge type in Military Section.

PATENTS: Patented.

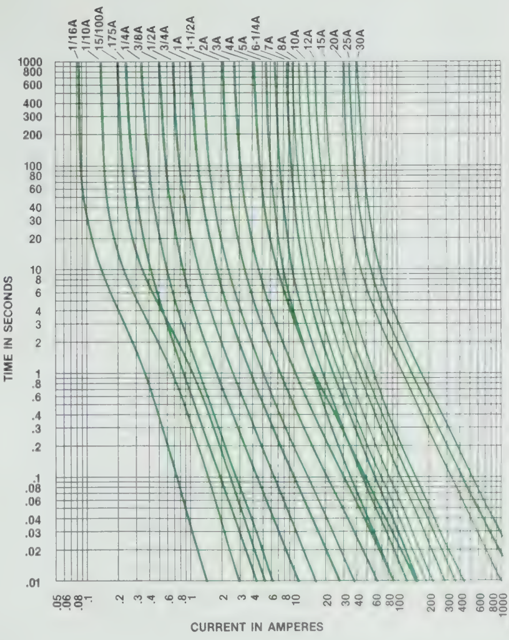
ORDERING INFORMATION:

Cartridge Catalog Number	Axial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
313.010	**315**.010	1/100	250	3300	0.000121
313.031	**315**.031	1/32	250	330	0.00303
313.040	**315**.040	4/100	250	220	0.00630
313.062	**315**.062	1/16	250	91.0	0.0210
313.100	**315**.100	1/10	250	33.3	0.0850
313.125	**315**.125	1/8	250	22.3	0.152
313.150	**315**.150	15/100	250	15.3	0.270
313.175	**315**.175	.175	250	8.60	0.177
313.187	**315**.187	3/16	250	7.43	0.230
313.200	**315**.200	2/10	250	6.54	0.270
313.250	**315**.250	1/4	250	4.27	0.385
313.300	**315**.300	3/10	250	3.11	0.730
313.375	**315**.375	3/8	250	2.08	1.23
313.400	**315**.400	4/10	250	1.86	1.35
313.500	**315**.500	1/2	250	1.25	2.55
313.600	**315**.600	6/10	250	0.914	4.00
313.700	**315**.700	7/10	250	0.695	5.90
313.750	**315**.750	3/4	250	0.617	7.16
313.800	**315**.800	8/10	250	0.550	8.00
313 001	**315** 001	1	250	0.375	14.0
313 01.2	**315** 01.2	1 2/10	250	0.276	21.5
313 1.25	**315** 1.25	1¼	250	0.258	24.0
313 01.5	**315** 01.5	1½	250	0.190	38.0
313 01.6	**315** 01.6	1 6/10	250	0.170	49.6
313 01.8	**315** 01.8	1 8/10	250	0.140	58.0
313 002	**315** 002	2	250	0.116	77.0
313 2.25	**315** 2.25	2¼	250	0.0960	121.0
313 02.5	**315** 02.5	2½	250	0.0805	130.0
313 02.8	**315** 02.8	2 8/10	250	0.0670	170.0
313 003	**315** 003	3	250	0.0588	200.0
313 03.2	**315** 03.2	3 2/10	250	0.0525	209.0
313 004	**315** 004	4	250	0.0308	76.1
313 005	**315** 005	5	250	0.0212	140.0
313 6.25	**315** 6.25	6¼	250	0.0152	242.0
313 6.30	**315** 6.30	6.30	250	0.0152	242.0
313 007	**315** 007	7	250	0.0127	347.0
313 008	**315** 008	8	250	0.0110	445.0
313 010	**315** 010	10	32	0.00820	760.0
313 012	**315** 012	12	32	0.00640	1200.0
313 015	**315** 015	15	32	0.00500	1870.0
313 020	**315** 020	20	32	0.00220	9560.0
313 025	**315** 025	25	32	0.00170	16500.0
313 030	**315** 030	30	32	0.00120	26900.0

313 000 **SERIES FUSE DIMENSIONS:**
Diameter: ¼″; Length: 1¼″.

315 000 **SERIES FUSE DIMENSIONS:**
Diameter: .275 Length 1.2″
Lead Diameter: .032″ (1/100 – 15A), .040″ (20 – 30A)
Lead Length: 1.5″
Lead Material: Solder coated copper.

Average Time Current Curves



CERAMIC BODY

3AB Fast-Acting Type

QPL

Ceramic body construction permits higher interrupting ratings and voltage ratings. Ideal for applications where high current loads are expected.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
110%	1/8–30	4 hours, Minimum
135%	1/8–30	1 hour, Maximum
200%	1/8–12	15 seconds, Maximum
200%	15–30	30 seconds, Maximum

AGENCY APPROVALS: Listed by Underwriters Laboratories and Certified by CSA through 15 amperes. Recognized under the Components Program of Underwriters Laboratories from 20 through 30 amperes. Approved by MITI from 10 through 15 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

FUSES TO MIL SPEC: See F03A cartridge type in Military Section.

ORDERING INFORMATION:

Cartridge Catalog Number	Axial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
314.125	324.125	1/8	250	6.20	0.00149
314.250	324.250	1/4	250	1.95	0.0140
314.375	324.375	3/8	250	0.820	0.050
314.500	324.500	1/2	250	0.500	0.115
314.750	324.750	3/4	250	0.250	0.466
314 001	324 001	1	250	0.189	0.690
314 002	324 002	2	250	0.0700	11.0
314 003	324 003	3	250	0.0432	14.6
314 004	324 004	4	250	0.0470	10.4
314 005	324 005	5	250	0.0300	26.0
314 006	324 006	6	250	0.0240	45.0
314 007	324 007	7	250	0.0187	71.0
314 008	324 008	8	250	0.0153	105.0
314 010	324 010	10	250	0.0105	206.0
314 012	324 012	12	250	0.00760	570.0
314 015	324 015	15	250	0.00505	292.0
314 020	324 020	20	250	0.00355	631.0
314 025	324 025	25	125	0.00235	1450.0
314 030	324 030	30	125	0.00182	2490.0

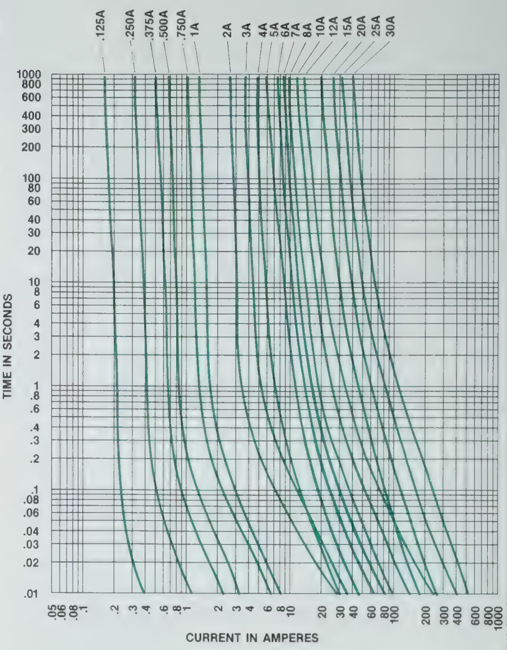
314 000 Series — Cartridge

FUSE DIMENSIONS:
Diameter: ¼″, Length: 1¼″

324 000 Series — Axial Leads

FUSE DIMENSIONS:
Diameter: .275″, Length: 1.2″
Lead Diameter: .032″ (⅛–15A), .040″ (20–30A)
Lead Length: 1.5″
Lead Material: Solder coated copper

Average Time Current Curves



CERAMIC BODY

3AB Slo-Blo® Type Fuse

UL❶ CSA❶ RU❶ QPL❷

Ceramic body construction permits higher interrupting ratings and voltage ratings. Ideal for applications where high current loads are expected.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
110%	1/100-30	4 hours, Minimum
135%	1/100-30	1 hour, Maximum
200%	1/100-3.2	5 sec., Min.; 30 sec. Max.
200%	4-30	5 sec., Min.; 60 sec. Max.

AGENCY APPROVALS:❶ Listed by Underwriters Laboratories and Certified by CSA from 1/4 through 10 amperes. Recognized under the Components Program of Underwriters Laboratories from 12 through 30 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

FUSES TO MIL SPEC:❷ See F03B cartridge type in Military Section.

PATENTS: Patented.

ORDERING INFORMATION:

Cartridge Catalog Number	Axial Lead Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
326.010	325.010	1/100	250	3300	0.00148
326.031	325.031	1/32	250	330	0.0110
326.062	325.062	1/16	250	91.0	0.0276
326.100	325.100	1/10	250	33.3	0.0870
326.125	325.125	1/8	250	22.3	0.100
326.150	325.150	15/100	250	15.3	0.143
326.175	325.175	.175	250	8.84	0.220
326.187	325.187	3/16	250	7.67	0.230
326.200	325.200	2/10	250	6.72	0.213
326.250	325.250	1/4	250	4.40	0.432
326.300	325.300	3/10	250	3.20	0.690
326.375	325.375	3/8	250	2.14	1.20
326.400	325.400	4/10	250	1.92	1.33
326.500	325.500	1/2	250	1.29	2.50
326.600	325.600	6/10	250	0.940	3.90
326.700	325.700	7/10	250	0.716	6.42
326.750	325.750	3/4	250	0.636	7.00
326.800	325.800	8/10	250	0.568	8.20
326 001	325 001	1	250	0.386	16.3
326 01.2	325 01.2	$1\frac{2}{10}$	250	0.284	22.0
326 1.25	325 1.25	$1\frac{1}{4}$	250	0.266	24.0
326 01.5	325 01.5	$1\frac{1}{2}$	250	0.196	40.1
326 01.6	325 01.6	$1\frac{6}{10}$	250	0.175	45.0
326 002	325 002	2	250	0.120	80.0
326 02.5	325 02.5	$2\frac{1}{2}$	250	0.0830	136.0
326 02.8	325 02.8	$2\frac{8}{10}$	250	0.0690	170.0
326 003	325 003	3	250	0.0600	200.0
326 03.2	325 03.2	$3\frac{2}{10}$	250	0.0535	214.0
326 004	325 004	4	250	0.0755	9.71
326 005	325 005	5	250	0.0518	25.0
326 6.25	325 6.25	$6\frac{1}{4}$	250	0.0343	60.4
326 007	325 007	7	250	0.0225	47.3
326 008	325 008	8	250	0.0191	67.1
326 010	325 010	10	250	0.0131	137.0
326 012	325 012	12	250	0.0066	129.0
326 015	325 015	15	250	0.0049	245.0
326 020	325 020	20	250	0.0033	575.0
326 025	325 025	25	125	0.0024	1030.0
326 030	325 030	30	125	0.0019	1690.0

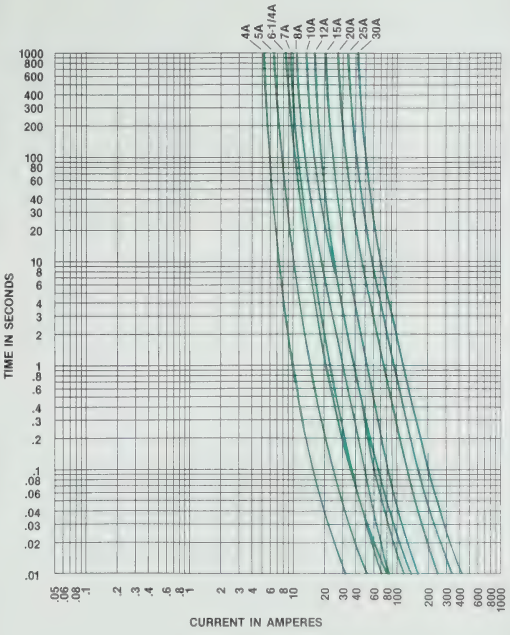
326 000 Series — Cartridge

FUSE DIMENSIONS:
Diameter: ¼″, Length: 1¼″

325 000 Series — Axial Leads

FUSE DIMENSIONS:
Diameter: .275″ Length 1.2″
Lead Diameter: .032″ (1/100 – 15A), .040″ (20 – 30A)
Lead Length: 1.5″
Lead Material: Solder coated copper.

Average Time Current Curves



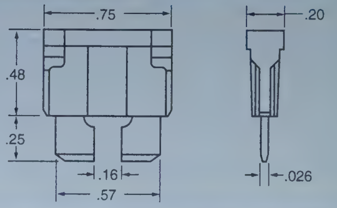
LOW VOLTAGE

Autofuse® Fuse Fast-Acting Type ⁰ ⁰

Designed and originated by Littelfuse for the automotive industry, the ATO® fuse has become the original equipment circuit protection standard for foreign and domestic automobiles and trucks. Readily identifiable and easily replaced, this fuse can be specified for a variety of low voltage electronic applications.

257 000 Series

Reference Dimensions



Reference pg. 71, ATO® Fuse Clip for P.C. Board mounting.

ELECTRICAL CHARACTERISTICS:

TIME CURRENT CHARACTERISTICS

% of Rating	Current Rating	Opening Time	
		Minimum	**Maximum**
110%	1-40 Amp	100 Hours	—
135%	1-2 Amp	.50 sec	1800 sec
	3-40 Amp	.75 sec	1800 sec
200%	1-2 Amp	.10 sec	5 sec
	3-40 Amp	.15 sec	5 sec
350%	1-2 Amp	.020 sec	.5 sec
	3-40 Amp	.080 sec	.5 sec

AGENCY APPROVALS: ⁰ Listed by Underwriters Laboratories. Certified by CSA, 3-30 amperes.

DESIGN STANDARDS: U.L. Standard for Automotive Blade Type Fuses. SAE (Society of Automotive Engineers) J1284.

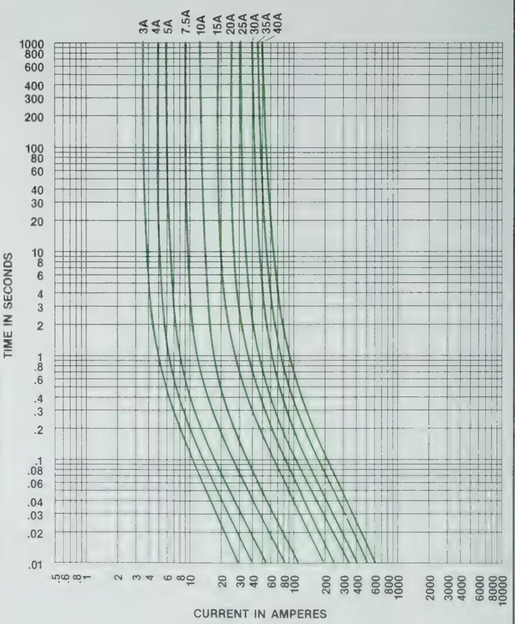
PATENTS: Patented.

COLOR-CODING: Autofuse® fuses are color-coded for easy amperage identification.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Color Code	Nominal Resistance Cold Ohms	Minimum Melting I²t A² Sec.
257 001	1	32	Black	0.123	0.4
257 002	2	32	Grey	0.050	1.4
257 003	3	32	Violet	0.031	7.4
257 004	4	32	Pink	0.023	14
257 005	5	32	Tan	0.018	26
257 07.5	7½	32	Brown	0.011	60
257 010	10	32	Red	0.0077	115
257 015	15	32	Blue	0.0048	340
257 020	20	32	Yellow	0.0033	520
257 025	25	32	Natural	0.0025	1080
257 030	30	32	Green	0.0019	1510
257 035	35	32	Blue Green	0.0016	2280
257 040	40	32	Amber	0.0014	3310

Average Time Current Curves



LOW VOLTAGE

MINI® Fuse Fast-Acting Type

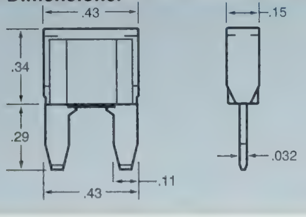
The MINI® Fuse is smaller than its predecessor, the ATO® or AUTOFUSE® fuses, which permit more fuses in the same amount of space. More fuses in the same space satisfy the requirement that more circuits be individually fused in newer automobiles.

ELECTRICAL CHARACTERISTICS:

TIME CURRENT CHARACTERISTICS

% of Rating	Opening Time Minimum	 Maximum
110%	100 Hours	—
135%	.75 sec	1800 sec
200%	.15 sec	5 sec
350%	.080 sec	.250 sec
600%	.030 sec	.100 sec

Reference Dimensions:



Refer to pg. 62 for Mini Fuse P.C. Board fuseholders.

PHYSICAL SPECIFICATIONS:

Materials: Plastic Body/Silver-Plated Terminals.

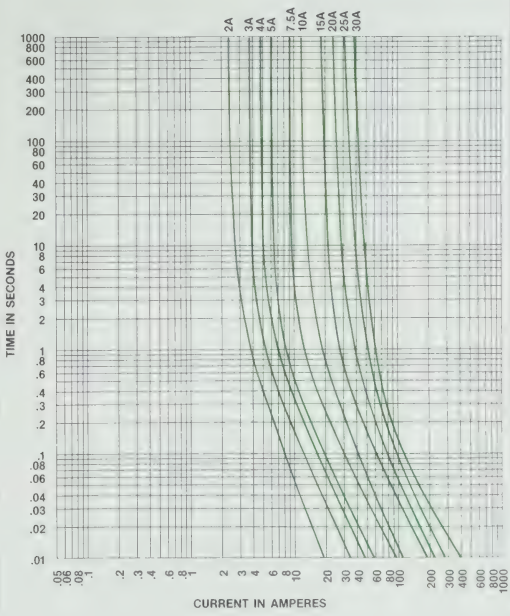
PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Color Code	Nominal Resistance Cold Ohms	Minimum Melting I^2t A^2 Sec.
297 002	2	32	Grey	0.056	2.8
297 003	3	32	Violet	0.034	9.4
297 004	4	32	Pink	0.024	17
297 005	5	32	Tan	0.018	25
297 07.5	7½	32	Brown	0.011	68
297 010	10	32	Red	0.0073	93
297 015	15	32	Blue	0.0045	270
297 020	20	32	Yellow	0.0032	380
297 025	25	32	Natural	0.0023	625
297 030	30	32	Green	0.0018	1130

Tool for fuse removal or replacement 097024.

Average Time Current Curves



LOW VOLTAGE

MAXI™ Fuse Slo-Blo® Type Fuse

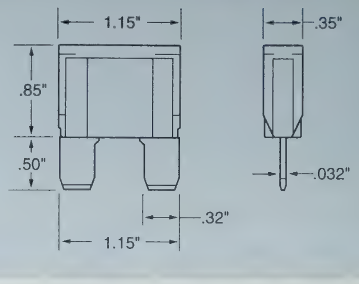
The MAXI™ Fuse is available in a higher range of amperage ratings (20–80 amperes) than the MINI® Fuse and AUTOFUSE® Fuse designs and is larger in physical size. A typical MAXI™ Fuse application in today's more sophisticated automobile circuits is protection of the wiring harness by replacing the fusible wire or fusible link, which is often a plain piece of small wire.

ELECTRICAL CHARACTERISTICS:

TIME-CURRENT CHARACTERISTICS

% of Ampere Rating	Opening Time Max./Min. (Seconds)						
	20A	30A	40A	50A	60A	70A	80A
135%	1800 60	1800 60	1800 60	1800 60	1800 60	3600 60	3600 60
200%	20 4	30 6	40 8	50 10	60 15	60 4	60 4
350%	2 .7	4 1	5 1.4	6 1.7	7 2	2 .2	2 .2
600%	1 .15	1 .20	1 .20	1 .20	1 .20	.15 .04	.15 .04

Reference Dimensions



PHYSICAL SPECIFICATIONS:

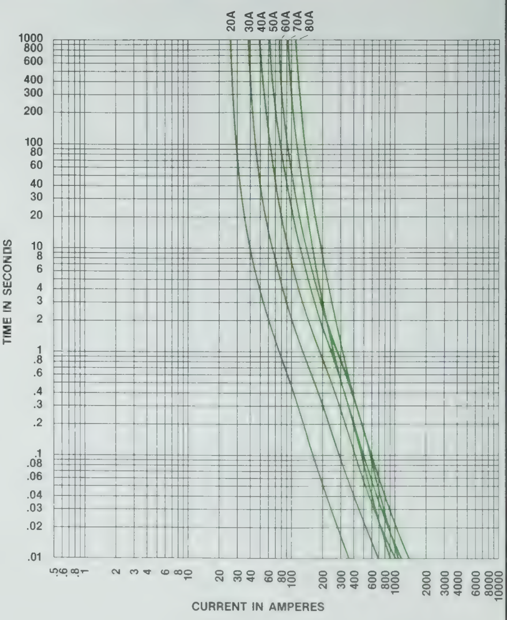
Materials: Plastic Body/Silver-Plated Terminals.

PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Color Code	Nominal Resistance Cold Ohms	Minimum Melting I²t A² Sec.
299 020	20	32	Yellow	0.0031	1100
299 030	30	32	Green	0.0020	4070
299 040	40	32	Amber	0.0014	8450
299 050	50	32	Red	0.0011	11300
299 060	60	32	Blue	0.00089	15300
299 070	70	32	Tan	0.00069	6900
299 080	80	32	Natural	0.00059	8800

Average Time Current Curves



SPECIAL

3AB Very Fast-Acting Type

For protection of silicon controlled rectifiers and similar solid-state devices.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
100%	1–30	4 hours, **Minimum**
250%	1–10	.2 seconds, **Maximum**
250%	12–30	1 second, **Maximum**

APPROVALS: Recognized under the Components Program of Underwriters Laboratories.

FUSE DIMENSIONS:
Diameter: ¼″
Length: 1¼″

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating
322 001	1	250
322 1.25	1¼	250
322 002	2	250
322 003	3	250
322 004	4	250
322 005	5	250
322 006	6	250
322 007	7	250
322 008	8	250
322 009	9	250
322 010	10	250
322 012	12	65
322 015	15	65
322 020	20	65
322 025	25	65
322 030	30	65

Indicating/Alarm Fast-Acting Type

For telecommunications equipment and similar applications.

ELECTRICAL CHARACTERISTICS:

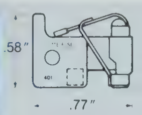
% of Ampere Rating	Opening Time
100%	10 minutes, **Minimum**
150%	5 minutes, **Maximum**

APPROVALS: Recognized under the Components Program of Underwriters Laboratories.

INDICATOR FLAG: Color-coded to indicate ampere rating.

BODY: Black phenolic with UL 94V0 flammability rating.

CONTACTS: Bright alloy-plated beryllium copper.



NOTE: Mating 402 001 fuseholder available: see fuseholder section.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Flag Color Code	AC Voltage Rating	DC Voltage Rating
401.180	18/100	Yellow	125	60
401.250	¼	Violet	125	60
401.500	½	Red	125	60
401.650	65/100	Black	125	60
401.750	¾	Brown	125	60
401 001	1	Gray	125	60
401 1.33	1⅓	White	125	60
401 01.5	1½	Yellow/White	125	60
401 002	2	Orange	125	60
401 003	3	Blue	125	60
401 03.5	3½	Blue/White	125	60
401 004	4	Brown/White	125	60
401 005	5	Green	125	60
401 07.5	7½	Black/White	125	60
401 010	10	Red/White	125	60

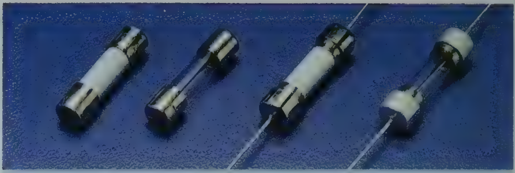
DESIGNED TO IEC STANDARD

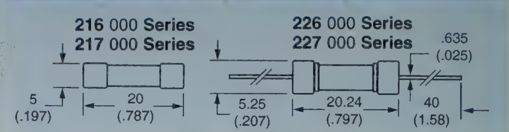
5 × 20 mm Fast-Acting Type

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	216 000 SERIES 225 000 SERIES TYPE F, Sheet I Ampere Rating		217 000 SERIES 227 000 SERIES TYPE F, Sheet II Ampere Rating	
	.05 - 3.15A	4 - 10A	.032 - .100A	.125 - 10A
150%	60 minutes minimum	60 minutes minimum	60 minutes minimum	60 minutes minimum
210%	30 minutes maximum	30 minutes maximum	30 minutes maximum	30 minutes maximum
275%	0.01 - 2 seconds	0.01 - 3 seconds	0.01 - 0.5 seconds	0.05 - 2 seconds
400%	0.003 - 0.3 seconds	0.003 - 0.3 seconds	0.003 - 0.1 seconds	0.01 - 0.3 seconds
1000%	0.02 sec. maximum	0.02 sec. maximum	0.02 sec. maximum	0.02 sec. maximum

IEC 127:*	Sheet I	Sheet II
APPROVALS:[θ]	SEMKO approved thru 6.3 amps. Recognized under the Components Program of Underwriters Laboratories and recognized by CSA.	SEMKO approved thru 6.3 amps: BSI approved 0.4–5 amps. VDE approved 0.05–5 amps. Recognized under the Components Program of Underwriters Laboratories and recognized by CSA.
INTERRUPTING RATING:	1500 Amperes	35 Amperes or 10 x rated current; whichever is greater.





Note: Metric dimensions are shown. Inch dimensions are in parentheses.

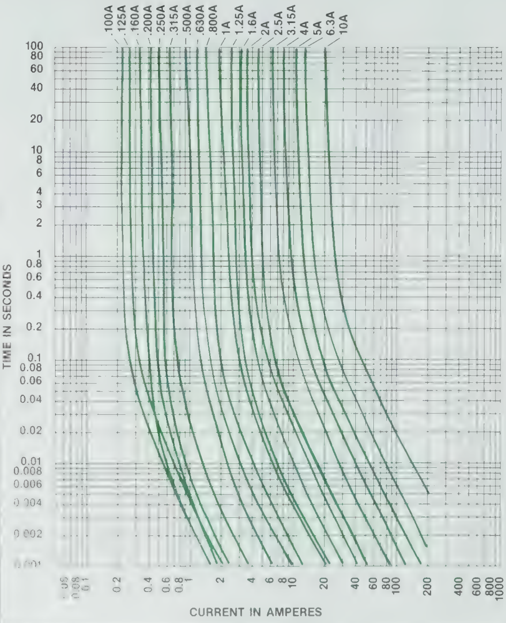
ORDERING INFORMATION:

Catalog Number	Catalog Number	Ampere Rating	Voltage Rating	Catalog Number	Catalog Number	Ampere Rating	Voltage Rating
—	**217**.032	.032	250	**216**.630	**217**.630	.630	250
—	**217**.040	.040	250	**216**.800	**217**.800	.800	250
216.050	**217**.050	.050	250	**216** 001	**217** 001	1	250
216.063	**217**.063	.063	250	**216** 1.25	**217** 1.25	1.25	250
216.080	**217**.080	.080	250	**216** 01.6	**217** 01.6	1.6	250
216.100	**217**.100	.100	250	**216** 002	**217** 002	2	250
216.125	**217**.125	.125	250	**216** 02.5	**217** 02.5	2.5	250
216.160	**217**.160	.160	250	**216** 3.15	**217** 3.15	3.15	250
216.200	**217**.200	.200	250	**216** 004	**217** 004	4	250
216.250	**217**.250	.250	250	**216** 005	**217** 005	5	250
216.315	**217**.315	.315	250	**216** 06.3	**217** 06.3	6.3	250
216.400	**217**.400	.400	250	**216** 008	**217** 008	8*	250
216.500	**217**.500	.500	250	**216** 010	**217** 010	10*	250

* IEC Standards for 5 × 20 mm fuses do not include ratings above 6.3 amperes.

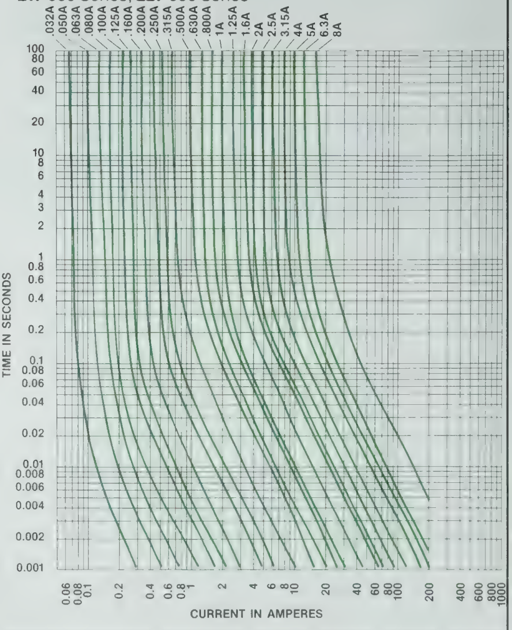
Average Time Current Curves

216 000 Series, **226** 000 Series



Average Time Current Curves

217 000 Series, **227** 000 Series



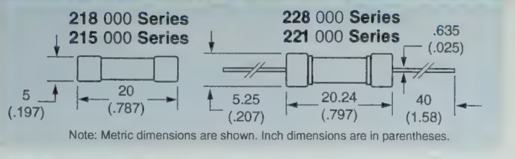
DESIGNED TO IEC STANDARD

5 × 20 mm Slo-Blo® Type Fuse

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	218 000 SERIES 228 000 SERIES TYPE T, Sheet III Ampere Rating		215 000 SERIES 221 000 SERIES TYPE T, Sheet V Ampere Rating	
	.032 - .100A	.125 - 10A	1 - 3.15A	4 - 6.3A
150%	60 minutes minimum	60 minutes minimum	60 minutes minimum	60 minutes minimum
210%	2 minutes maximum	2 minutes maximum	30 minutes maximum	30 minutes maximum
275%	0.2 – 10 seconds	0.6 – 10 seconds	1 – 80 seconds	1 – 80 seconds
400%	0.04 – 3 seconds	0.15 – 3 seconds	.095 – 5 seconds	.150 – 5 seconds
1000%	0.01 – 0.3 seconds	0.02 – 0.3 seconds	.010 – .1 seconds	.020 – .1 seconds

IEC 127:*	Sheet III	Sheet V
APPROVALS:⁰	SEMKO approved thru 6.3 amps. BSI and VDE approved 0.05–6.3 amps. Recognized under the Components Program of Underwriters Laboratories and recognized by CSA.	SEMKO approved thru 6.3A. VDE and BSI approved thru 6.3A. MITI approved 1–5A Recognized under the Components Program of Underwriters Laboratories and recognized by CSA.
INTERRUPTING RATING:	35 Amperes or 10 x rated current; whichever is greater.	1500 Amperes



Note: Metric dimensions are shown. Inch dimensions are in parentheses.

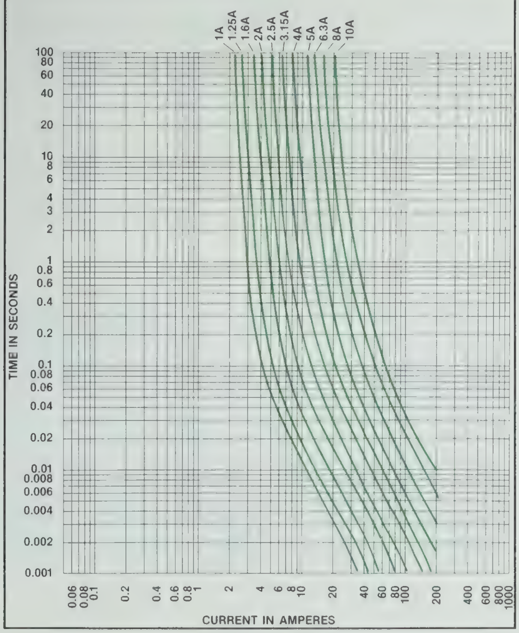
ORDERING INFORMATION:

Catalog Number	Catalog Number	Ampere Rating	Voltage Rating	Catalog Number	Catalog Number	Ampere Rating	Voltage Rating
218.032	—	.032	250	**218**.630	**215**.630	.630	250
218.040	—	.040	250	**218**.800	**215**.800	.800	250
218.050	—	.050	250	**218** 001	**215** 001	1	250
218.063	—	.063	250	**218** 1.25	**215** 1.25	1.25	250
218.080	—	.080	250	**218** 01.5	**215** 01.5	1.6	250
218.100	—	.100	250	**218** 002	**215** 002	2	250
218.125	—	.125	250	**218** 02.5	**215** 02.5	2.5	250
218.160	—	.160	250	**218** 3.15	**215** 3.15	3.15	250
218.200	**215**.200	.200	250	**218** 004	**215** 004	4	250
218.250	**215**.250	.250	250	**218** 005	**215** 005	5	250
218.315	**215**.315	.315	250	**218** 06.3	**215** 06.3	6.3	250
218.400	**215**.400	.400	250	**218** 008	**215** 008	8*	250
218.500	**215**.500	.500	250	**218** 010	**215** 010	10*	250

* IEC Standards for 5 × 20 mm fuses do not include ratings above 6.3 amperes

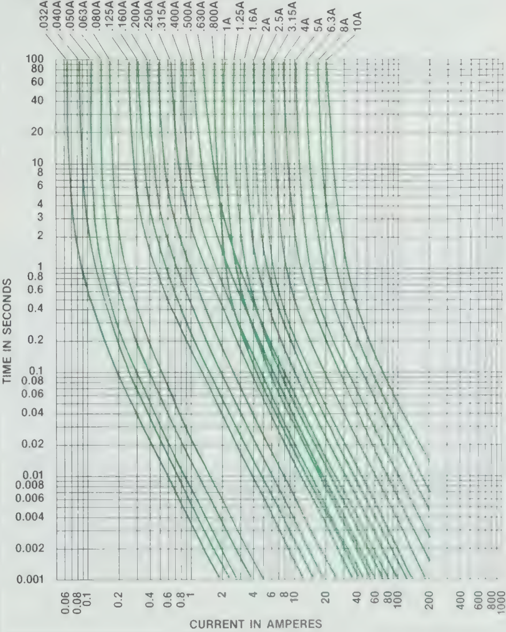
Average Time Current Curves

215 000 Series, **221** 000 Series



Average Time Current Curves

218 000 Series, **228** 000 Series



DESIGNED TO MEET UL/CSA STANDARDS

5 × 20 mm Fast-Acting Type

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Min**imum
135%	1 hour, **Max**imum
200%	5 seconds, **Max**imum

AGENCY APPROVALS:° Listed by Underwriters Laboratories and Certified by CSA. Approved by MITI from 1 through 5 amperes.

FUSE DIMENSIONS:

Cartridge —
Diameter: 5mm (0.197″)
Length: 20mm (0.787″)

Axial —
Diameter: 5.25mm (.207″)
Length: 20.24mm (.797″)

ORDERING INFORMATION:

Cartridge Catalog Number	Axial Catalog Number	Ampere Rating	Voltage Rating
235.100	**236**.100	1/10	250
235.125	**236**.125	1/8	250
235.200	**236**.200	2/10	250
235.250	**236**.250	1/4	250
235.300	**236**.300	3/10	250
235.400	**236**.400	4/10	250
235.500	**236**.500	1/2	250
235.600	**236**.600	6/10	250
235.700	**236**.700	7/10	250
235.800	**236**.800	8/10	250
235 001	**236** 001	1	250
235 1.25	**236** 1.25	1¼	250
235 01.6	**236** 01.6	1⁶⁄₁₀	250
235 002	**236** 002	2	250
235 02.5	**236** 02.5	2½	250
235 003	**236** 003	3	250
235 004	**236** 004	4	125
235 005	**236** 005	5	125
235 006	**236** 006	6	125

5 × 20 mm Slo-Blo® Type

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Min**imum
135%	1 hour, **Max**imum
200%	5 seconds, **Min**imum

APPROVALS:° Listed by Underwriters Laboratories and Certified by CSA. Approved by MITI from 1 through 3 amperes.

PATENTS: Patented.

FUSE DIMENSIONS:

Cartridge —
Diameter: 5mm (0.197″)
Length: 20mm (0.787″)

Axial —
Diameter: 5.25mm (.207″)
Length: 20.24mm (.797″)

ORDERING INFORMATION:

Cartridge Catalog Number	Axial Catalog Number	Ampere Rating	Voltage Rating
239.200	**238**.200	2/10	250
239.250	**238**.250	1/4	250
239.300	**238**.300	3/10	250
239.400	**238**.400	4/10	250
239.500	**238**.500	1/2	250
239.600	**238**.600	6/10	250
239.700	**238**.700	7/10	250
239.750	**238**.750	3/4	250
239.800	**238**.800	8/10	250
239 001	**238** 001	1	250
239 1.25	**238** 1.25	1¼	250
239 01.6	**238** 01.6	1⁶⁄₁₀	250
239 002	**238** 002	2	250
239 02.5	**238** 02.5	2½	250
239 003	**238** 003	3	250
239 004	**238** 004	4	125

SFE Fast-Acting Type

UL

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Min**imum
135%	1 hour, **Max**imum
200%	10 seconds, **Max**imum

APPROVALS: Listed by Underwriters Laboratories.

DESIGN STANDARDS: U.L. Standard 275. SAE (Society of Automotive Engineers) J554.

FUSE DIMENSIONS:
Diameter: ¼″
Length: See chart.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating	Fuse Length
307 004	4	32	⅝″
307 006	6	32	¾″
307 07.5	7½	32	⅞″
307 009	9	32	⅞″
307 014	14	32	1 1/16″
307 020	20	32	1¼″
307 030	30	32	1 7/16″

3AG Fast-Acting Type

UL❶ CSA❶

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
100%	4–35	4 hours, **Min**imum
135%	4–35	1 hour, **Max**imum
200%	4–30	10 seconds, **Max**imum
200%	35	20 seconds, **Max**imum

APPROVALS:❶ Listed by Underwriters Laboratories and Certified by CSA through 30 amperes.

DESIGN STANDARDS: U.L. Standard 275.

FUSE DIMENSIONS:
Diameter: ¼″
Length: 1¼″

ORDERING INFORMATION:

Catalog Number	Ampere Rating	Voltage Rating
311 004	4	32
311 005	5	32
311 006	6	32
311 007	7	32
311 07.5	7½	32
311 008	8	32
311 010	10	32
311 012	12	32
311 015	15	32
311 025	25	32
311 030	30	32
311 035	35	32

For 20-ampere rating use **307** 020.

MIDGET

AC Fast-Acting Type

Ⓤ① Ⓒ① QPL②

Fast-acting fuses designed for use in circuits with high AC fault current capacity or where military approval is required.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
110%	1/10–30	4 hours, **Minimum**
135%	1/10–30	1 hour, **Maximum**
200%	1/10–4	2 seconds, **Maximum**
200%	5–12	15 seconds, **Maximum**
200%	15–30	2 minutes, **Maximum**

APPROVALS:① Listed by Underwriters Laboratories and Certified by CSA from 3/10 through 30 amperes.

KLK INTERRUPTING RATING:
100,000 amperes (capable of 200,000) at 600VAC

MILITARY TYPE F60C INTERRUPTING RATING:
200,000 amperes at 500VAC
150,000 amperes at 500VDC

FUSES TO MIL SPEC:② See F60C type in Military Section.

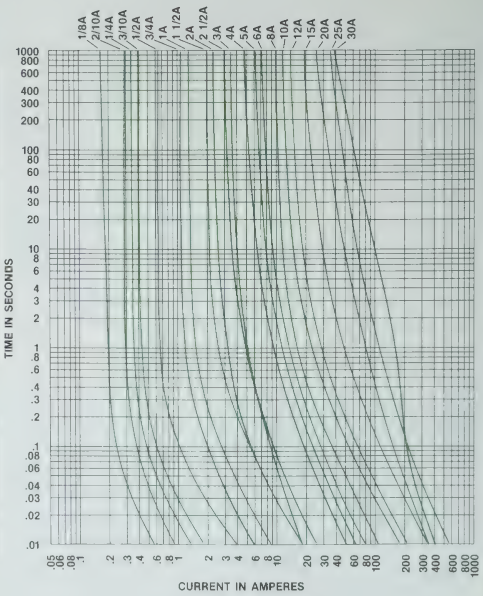
PATENTS: Patented

FUSE DIMENSIONS:
Diameter: 13/32″; Length: 1 1/2″.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	AC Voltage Rating
KLK 1/10	.100	600
KLK 1/8	.125	600
KLK 2/10	.200	600
KLK 1/4	.250	600
KLK 3/10	.300	600
KLK 1/2	.500	600
KLK 3/4	.750	600
KLK 1	1	600
KLK 1-1/2	1.5	600
KLK 2	2	600
KLK 2-1/2	2.5	600
KLK 3	3	600
KLK 3-1/2	3.5	600
KLK 4	4	600
KLK 5	5	600
KLK 6	6	600
KLK 7	7	600
KLK 8	8	600
KLK 9	9	600
KLK 10	10	600
KLK 12	12	600
KLK 15	15	600
KLK 20	20	600
KLK 25	25	600
KLK 30	30	600

Average Time Current Curves



MIDGET

DC Fast-Acting Type

UL① CSA① QPL②

Fast-acting fuses designed for use in circuits with DC fault currents up to 10,000 amperes. Same AC interrupting ratings as KLK series.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
110%	1/10–30	4 hours, **Minimum**
135%	1/10–30	1 hour, **Maximum**
200%	1/10–4	2 seconds, **Maximum**
200%	5–12	15 seconds, **Maximum**
200%	15–30	2 minutes, **Maximum**

AC/DC APPROVALS:①Listed by Underwriters Laboratories and Certified by CSA from 3/10 through 30 amperes.

INTERRUPTING RATING:
10,000 amperes at 600VDC
100,000 amperes (capable of 200,000) at 600VAC

FUSES TO MIL SPEC: ②See **KLK Series** for QPL fuses with DC ratings.

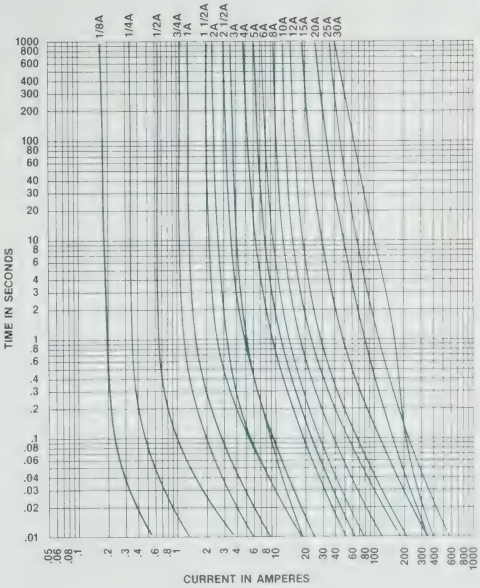
PATENTS: Patented

FUSE DIMENSIONS:
Diameter: 13/32"; Length: 1 1/2".

ORDERING INFORMATION:

Catalog Number	Ampere Rating	DC Voltage Rating
KLK D 1/10	.100	600
KLK D 1/8	.125	600
KLK D 2/10	.200	600
KLK D 1/4	.250	600
KLK D 3/10	.300	600
KLK D 1/2	.500	600
KLK D 3/4	.750	600
KLK D 1	1	600
KLK D 1-1/2	1.5	600
KLK D 2	2	600
KLK D 2-1/2	2.5	600
KLK D 3	3	600
KLK D 3-1/2	3.5	600
KLK D 4	4	600
KLK D 5	5	600
KLK D 6	6	600
KLK D 7	7	600
KLK D 8	8	600
KLK D 9	9	600
KLK D 10	10	600
KLK D 12	12	600
KLK D 15	15	600
KLK D 20	20	600
KLK D 25	25	600
KLK D 30	30	600

Average Time Current Curves



MIDGET

250 Volt Slo-Blo® Type

Ⓤ© QPL®

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Minimum**
135%	1 hour, **Maximum**
200%	12 seconds, **Minimum**

APPROVALS: Listed by Underwriters Laboratories and Certified by CSA.

INTERRUPTING RATING: 10,000 amperes at 250 VAC.

FUSES TO MIL SPEC:® See F09B type in Military Section.

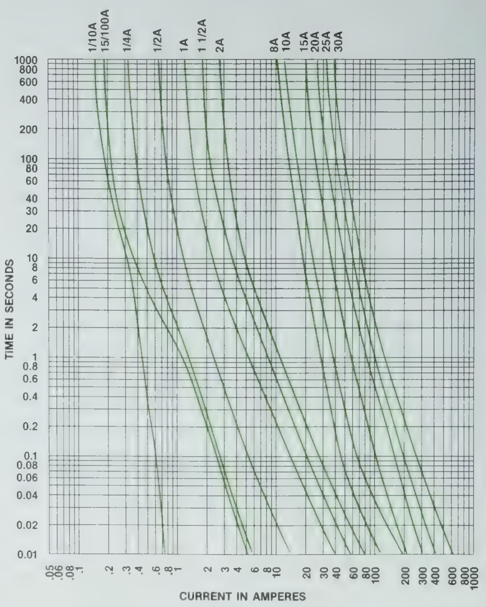
PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	AC Voltage Rating
FLM 1/10	.100	250
FLM 15/100	.150	250
FLM 2/10	.200	250
FLM 1/4	.250	250
FLM 3/10	.300	250
FLM 4/10	.400	250
FLM 1/2	.500	250
FLM 6/10	.600	250
FLM 8/10	.800	250
FLM 1	1	250
FLM 1-1/8	1.125	250
FLM 1-1/4	1.25	250
FLM 1-4/10	1.4	250
FLM 1-1/2	1.5	250
FLM 1-6/10	1.6	250
FLM 1-8/10	1.8	250
FLM 2	2	250
FLM 2-1/4	2.25	250
FLM 2-1/2	2.5	250
FLM 2-8/10	2.8	250
FLM 3	3	250
FLM 3-2/10	3.2	250
FLM 3-1/2	3.5	250
FLM 4	4	250
FLM 4-1/2	4.5	250
FLM 5	5	250
FLM 5-6/10	5.6	250
FLM 6	6	250
FLM 6-1/4	6.25	250
FLM 7	7	250
FLM 8	8	250
FLM 9	9	250
FLM 10	10	250
FLM 12	12	250
FLM 15	15	250
FLM 20	20	250
FLM 25	25	250
FLM 30	30	250

FUSE DIMENSIONS:
Diameter: $^{13}/_{32}$"; Length: $1^1/_2$".

Average Time Current Curves



MIDGET

500 Volt Slo-Blo® Type

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Min**imum
135%	1 hour, **Max**imum
200%	12 seconds, **Min**imum

APPROVALS: Listed by Underwriters Laboratories and Certified by CSA.

INTERRUPTING RATING: 10,000 amperes at 500 VAC.

PATENTS: Patented.

FUSE DIMENSIONS:
Diameter: $^{13}/_{32}$″; Length: $1^{1}/_{2}$″.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	AC Voltage Rating
FLQ 1/10	.100	500
FLQ 1/8	.125	500
FLQ 15/100	.150	500
FLQ 3/16	.187	500
FLQ 2/10	.200	500
FLQ 1/4	.250	500
FLQ 3/10	.300	500
FLQ 4/10	.400	500
FLQ 1/2	.500	500
FLQ 6/10	.600	500
FLQ 8/10	.800	500
FLQ 1	1	500
FLQ 1-1/8	1.125	500
FLQ 1-1/4	1.25	500
FLQ 1-1/2	1.5	500
FLQ 1-6/10	1.6	500
FLQ 2	2	500
FLQ 2-1/4	2.25	500
FLQ 2-1/2	2.5	500
FLQ 3	3	500
FLQ 3-2/10	3.2	500
FLQ 3-1/2	3.5	500
FLQ 4	4	500
FLQ 4-1/2	4.5	500
FLQ 5	5	500
FLQ 5-6/10	5.6	500
FLQ 6	6	500
FLQ 6-1/4	6.25	500
FLQ 7	7	500
FLQ 8	8	500
FLQ 9	9	500
FLQ 10	10	500
FLQ 12	12	500
FLQ 14	14	500
FLQ 15	15	500
FLQ 20	20	500
FLQ 25	25	500
FLQ 30	30	500

MIDGET

Laminated Body Fast-Acting Type ㊤ ©

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Minimum**
135%	1 hour, **Maximum**
200%	30 seconds, **Maximum**

APPROVALS: Listed by Underwriters Laboratories and Certified by CSA.

INTERRUPTING RATING: 10,000 amperes at rated voltage AC.

NOTE: Not recommended for applications in humid areas.

FUSE DIMENSIONS:
Diameter: 13/32"; Length: 1½".

ORDERING INFORMATION:

Catalog Number	Ampere Rating	AC Voltage Rating
BLF 1/2	.500	250
BLF 1	1	250
BLF 1½	1.5	250
BLF 2	2	250
BLF 2½	2.5	250
BLF 3	3	250
BLF 4	4	250
BLF 5	5	250
BLF 6	6	250
BLF 6¼	6.25	250
BLF 7	7	250
BLF 8	8	250
BLF 9	9	250
BLF 10	10	250
BLF 12	12	250
BLF 15	15	250
BLF 20	20	125
BLF 25	25	125
BLF 30	30	125

Fibre Body Fast-Acting Type ㊤ © QPL❶

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Minimum**
135%	1 hour, **Maximum**
200%	30 seconds, **Maximum**

APPROVALS: Listed by Underwriters Laboratories and Certified by CSA.

INTERRUPTING RATING: 10,000 amperes at 250 VAC.

FUSES TO MIL SPEC:❶ See F09A type in Military Section.

FUSE DIMENSIONS:
Diameter: 13/32"; Length: 1½".

ORDERING INFORMATION:

Catalog Number	Ampere Rating	AC Voltage Rating
BLN 1	1	250
BLN 2	2	250
BLN 3	3	250
BLN 4	4	250
BLN 5	5	250
BLN 6	6	250
BLN 8	8	250
BLN 10	10	250
BLN 12	12	250
BLN 15	15	250
BLN 20	20	250
BLN 25	25	250
BLN 30	30	250

SPECIAL MIDGET

1⅜″ Long Fast-Acting Type

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
110%	2/10–10	4 hours, **Min**imum
135%	2/10–10	1 hour, **Max**imum
200%	2/10–5	5 seconds, **Max**imum
200%	6–10	10 seconds, **Max**imum

APPROVALS:① Listed by Underwriters Laboratories from ½ through 5 amperes and Certified by CSA from ½ through 5 amperes

INTERRUPTING RATING: 10,000 amperes at rated voltage AC.

PATENTS: Patented.

FUSE DIMENSIONS:
Diameter: 13/32″; Length: 1⅜″.

ORDERING INFORMATION:

Catalog Number	Ampere Rating	AC Voltage Rating
BLS 2/10	.200	600
BLS 4/10	.400	600
BLS 1/2	.500	600
BLS 3/4	.750	600
BLS 8/10	.800	600
BLS 1	1	600
BLS 1½	1.5	600
BLS 1 6/10	1.6	600
BLS 1 8/10	1.8	600
BLS 2	2	600
BLS 3	3	600
BLS 4	4	600
BLS 5	5	600
BLS 6	6	250
BLS 7	7	250
BLS 8	8	250
BLS 10	10	250

Slo-Blo® Indicating Type

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
110%	4 hours, **Min**imum
135%	1 hour, **Max**imum

APPROVALS: Listed by Underwriters Laboratories.

INTERRUPTING RATING: 10,000 amperes at rated voltage AC.

INDICATING PIN: Extends 0.3″ when fuse opens.

NOTE: Fuses rated 12—30 amperes have dual tube construction.

FUSE DIMENSIONS:
Diameter: 13/32″; Length: 1½″.

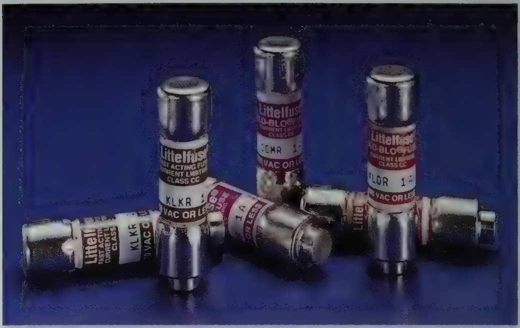
ORDERING INFORMATION:

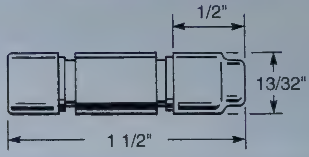
Catalog Number	Ampere Rating	Catalog Number	Ampere Rating	AC Voltage Rating
FLA 1/10	.100	**FLA** 5	5	125
FLA 15/100	.15	**FLA** 5-6/10	5.6	125
FLA 2/10	.200	**FLA** 6	6	125
FLA 1/4	.250	**FLA** 6-1/4	6.25	125
FLA 3/10	.300	**FLA** 7	7	125
FLA 4/10	.400	**FLA** 8	8	125
FLA 1/2	.500	**FLA** 10	10	125
FLA 6/10	.600	**FLA** 12	12	125
FLA 8/10	.800	**FLA** 15	15	125
FLA 1	1	**FLA** 20	20	125
FLA 1-1/8	1.125	**FLA** 25	25	125
FLA 1-1/4	1.250	**FLA** 30	30	125
FLA 1-4/10	1.4			125
FLA 1-1/2	1.5			125
FLA 1-6/10	1.6			125
FLA 1-8/10	1.8			125
FLA 2	2			125
FLA 2-1/4	2.25			125
FLA 2-1/2	2.5			125
FLA 2-8/10	2.8			125
FLA 3	3			125
FLA 3-2/10	3.2			125
FLA 3-1/2	3.5			125
FLA 4	4			125
FLA 4-1/2	4.5			125

SPECIAL MIDGET

Class CC Fast-Acting & Slo-Blo® Type Fuses ⓤ ©⁰

Fast-acting KLKR fuses provide fast-acting protection to equipment containing surge sensitive components. Use KLKR fuses for non-inductive loads not requiring time delay. CCMR Fuses (formerly KLMR) are specifically designed to withstand sustained starting currents of small motors. The CCMR fuses provide short-circuit protection for motor branch-circuits. KLDR fuses are specifically designed to withstand the momentary high magnetizing currents of control transformers, solenoids, and similar inductive loads.





ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
110%	1/10–30	4 hours, **Min**imum
135%	1/10–30	1 hour, **Max**imum

AMPERE RANGES:

KLKR: 1/10–30 amperes.
KLDR: 1/10–10 amperes.
CCMR: 2/10–30 amperes. (Formerly KLMR Series)

AGENCY APPROVALS:⁰ KLKR Series: UL listed Fast-Acting Class CC per UL 198C and CSA Certified HRCI-MISC (3/10–30A). KLDR, CCMR Series: UL listed Time-Delay Class CC per UL 198C and CSA Certified HRCI-MISC.

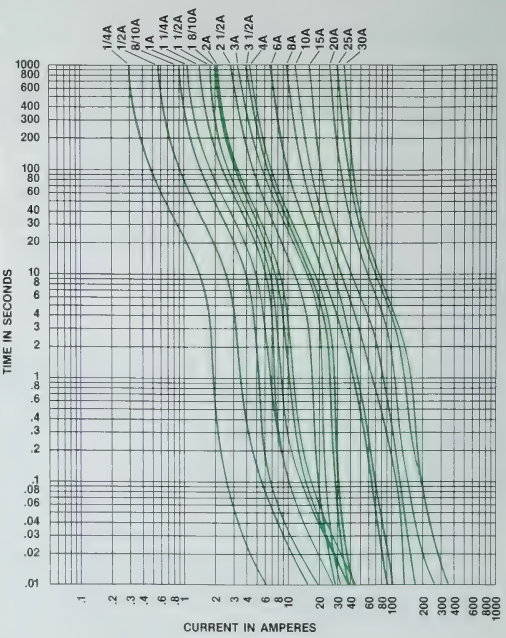
AGENCY FILE NUMBERS: UL E81895, CSA LR 29862.

INTERRUPTING RATINGS:
200,000 amperes at 600VAC.

ORDERING INFORMATION:

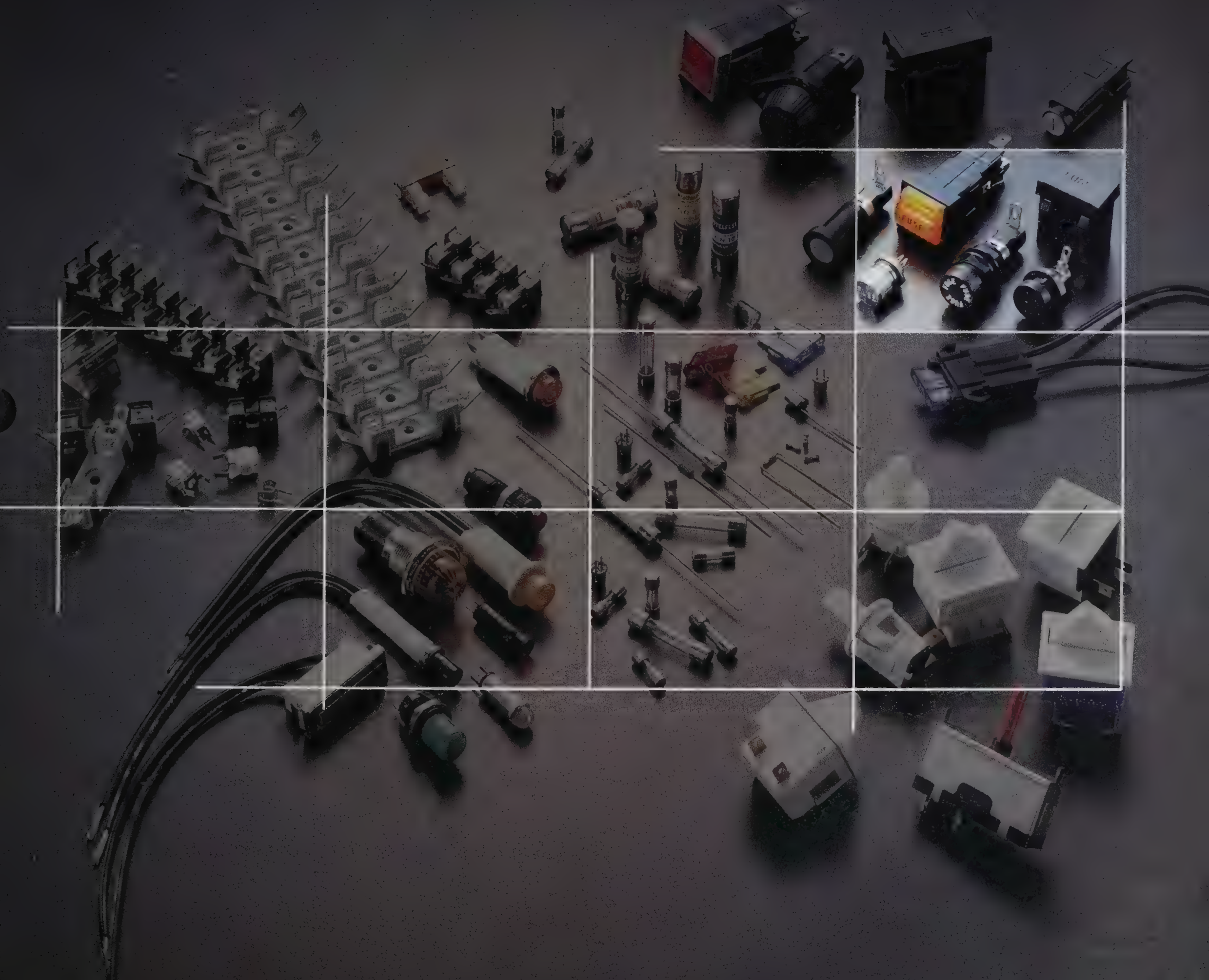
Catalog Number	Catalog Number	Catalog Number	Ampere Rating	Voltage Rating
KLKR.100	—	**KLDR**.100	1/10	600
KLKR.125	—	**KLDR**.125	1/8	600
KLKR.200	**CCMR**.200	**KLDR**.200	2/10	600
KLKR.250	**CCMR**.250	**KLDR**.250	1/4	600
KLKR.300	**CCMR**.300	**KLDR**.300	3/10	600
KLKR.500	**CCMR**.500	**KLDR**.500	1/2	600
KLKR.750	—	**KLDR**.750	3/4	600
KLKR 001	**CCMR** 001	**KLDR** 001	1	600
KLKR 01.5	**CCMR** 01.5	**KLDR** 01.5	1½	600
KLKR 002	**CCMR** 002	**KLDR** 002	2	600
KLKR 02.5	**CCMR** 02.5	**KLDR** 02.5	2½	600
KLKR 003	**CCMR** 003	**KLDR** 003	3	600
KLKR 03.5	**CCMR** 03.5	**KLDR** 03.5	3½	600
KLKR 004	**CCMR** 004	**KLDR** 004	4	600
KLKR 005	**CCMR** 005	**KLDR** 005	5	600
KLKR 006	**CCMR** 006	**KLDR** 006	6	600
KLKR 007	**CCMR** 007	**KLDR** 007	7	600
KLKR 008	**CCMR** 008	**KLDR** 008	8	600
KLKR 009	**CCMR** 009	**KLDR** 009	9	600
KLKR 010	**CCMR** 010	**KLDR** 010	10	600
KLKR 012	**CCMR** 012	—	12	600
KLKR 015	**CCMR** 015	—	15	600
KLKR 020	**CCMR** 020	—	20	600
KLKR 025	**CCMR** 025	—	25	600
KLKR 030	**CCMR** 030	—	30	600

CCMR Average Time Current Curves



NOTE: Contact factory for KLKR and KLDR Time-Current Curves.

FUSEHOLDERS



FOR 3AG, 5 × 20MM OR 2AG FUSES

International Shock-Safe Panel Mount Type

A complete selection of styles and options satisfy a wide variety of fuseholder design needs. Designed to eliminate the possibility of electrical shock, as defined in IEC standards 65 and 257. Universal fuseholder body will accept 3AG, 5 x 20mm, and 2AG fuse sizes depending on knob selected. Permits inventory reduction of bodies and provides knob interchange versatility. Anti-tease feature eliminates circuit interruption when knob is accidentally depressed. Five fuseholder types assure design flexibility. Available with two knob styles — screwdriver slot or fingergrip. Drip-proof option is available on screwdriver slot knob style. Available in two terminal styles — dual-purpose for soldering or 3/16″ NEMA quick connect; and 1/4″ NEMA/DIN quick connect. Quick fuse size identification is provided with color-coded letters on fingergrip knob and color-coded screwdriver slot knobs.

APPROVALS:

	3AG	5 x 20mm	2AG
*ЯU	20A 250V	10A 250V	10A 250V
CSA	20A 250V	10A250V	10A250V
SEMKO	6.3A 250V	6.3A 250V	—
VDE	10A 250V	10A 250V	—

*Recognized under the Components Program of Underwriters Laboratories

SPECIFICATIONS:

Electrical: Insulation Resistance: 10,000 Megohm minimum at 500 VDC. Contact Resistance: Less than .005 ohms average at currents up to 1 ampere.

Mounting: Threaded styles withstand 15 in.-lb. mounting torque.
Low profile and High profile panel thickness: .032″ min./.310″ max.
Quick mount panel thickness: .012″ min./.360″ max.
Rear mount panel thickness: .012″ min./.260″ max.

Molded Parts: Body Material: Black glass-filled thermoplastic (UL 94V0). Knob Material: Grey, blue or black glass-filled thermoplastic (UL 94V0). Hex Nut Material: Black glass-filled thermoplastic.

Knob: Finger-Grip, Fuse Extractor type or Screwdriver Slot, Fuse Extractor type with plated copper alloy insert. Plated copper alloy contact clips. Spring loaded, locking mechanism provides an anti-tease feature and will not vibrate loose.

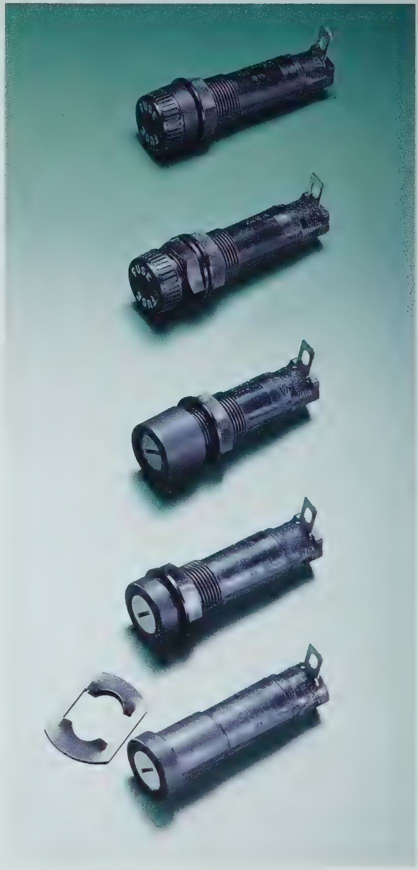
Terminals: Copper alloy. Tin-plated. Three styles available. A .187″ dual purpose terminal accepts wire for soldering or a Quick-Connect receptacle. .187″ terminal for NEMA Quick-Connect and .250″ terminal for NEMA/DIN Quick-Connect available.

Ambient Temperature: −40°C to +85°C.

Hardware: Threaded style fuseholders are supplied with a thermoplastic hex nut unassembled. Quick mount style fuseholders are supplied with a push-on type retaining nut, black oxide finish, unassembled. A synthetic rubber "O" ring will be supplied only with the screwdriver slot knob when the drip-proof version is requested. To order with a metal internal tooth lockwasher (L) and/or neoprene panel washer (N) and/or drip-proof synthetic rubber "O" ring (NP) [Screwdriver slot knob only], add the appropriate suffix (L, N, or NP) respectively (or in combination) to the catalog number.

Example: 3453LS7LNP is a holder supplied with a lockwasher, a neoprene panel washer, and a drip-proof "O" ring in addition to the hex nut.

PATENTS: Patented.



FOR 3AG, 5 × 20MM OR 2AG FUSES

International Shock-Safe Panel Mount Type

ORDERING INFORMATION:

EXAMPLE (Complete Assembly with options): 345 3 LS 7 L N

Series Number

Fuse Size

- **2** — 2AG .177″ x .570″
- **3** — 3AG .250″ x 1.250″
- **5** — 5 x 20mm .197″ x .787″

Body Type — Knob Type

- **LF** — Low Profile Body Black Fingergrip Knob
- **RF** — Rear Mount Body Black Fingergrip Knob
- Fingergrip Knob 2AG — Blue Letters 3AG — White Letters 5 x 20mm — Red Letters
- **HS** — High Profile Body Screwdriver Slot Knob
- **LS** — Low Profile Body Screwdriver Slot Knob
- **QS** — Quick Mount Body Screwdriver Slot Knob
- Screwdriver Slot Knob 2AG — Blue Knob 3AG — Grey Knob 5 x 20mm — Black Knob

Terminals

- **1** — 3/16″ (Rt. Angle) Dual Purpose Solder/QC
- **2** — 3/16″ (Straight) Dual Purpose Solder/QC
- **3** — 3/16″ (Rt. Angle) NEMA QC
- **4** — 3/16″ (Straight) NEMA QC
- **7** — 1/4″ (Rt. Angle) NEMA/DIN QC
- **8** — 1/4″ (Straight) NEMA/DIN QC

Options*

- **L** — Lockwasher
- **N** — Neoprene Washer
- **NP** — Drip-Proof "O" Ring** with Neoprene Washer

*Options (L, N, NP) can be ordered individually or in combination.

**Screwdriver slot knob only.

Note: To Order Knob Only:

Fuse Size	Fingergrip Knob Part Number	Screwdriver Slot Knob Part Number
2AG	3452LF1-020	3452LS1-020
3AG	3453LF1-020	3453LS1-020
5 x 20mm	3455LF1-020	3455LS1-020

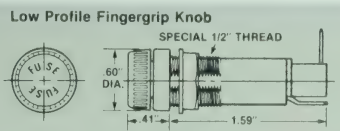
To Order Body Including Nut(s) Only:

Terminal Style	Bottom Terminal	Low Profile Body Part Number***	High Profile Body Part Number	Rear Mount Body Part Number	Quick Mount Body Part Number
3/16″ Dual Purpose	(Rt. Angle)	3453LF1-010	3453HS1-010	3453RF1-010	3453QS1-010
3/16″ Dual Purpose	(Straight)	3453LF2-010	3453HS2-010	3453RF2-010	3453QS2-010
3/16″ NEMA QC	(Rt. Angle)	3453LF3-010	3453HS3-010	3453RF3-010	3453QS3-010
3/16″ NEMA QC	(Straight)	3453LF4-010	3453HS4-010	3453RF4-010	3453QS4-010
1/4″ NEMA/DIN QC	(Rt. Angle)	3453LF7-010	3453HS7-010	3453RF7-010	3453QS7-010
1/4″ NEMA/DIN QC	(Straight)	3453LF8-010	3453HS8-010	3453RF8-010	3453QS8-010

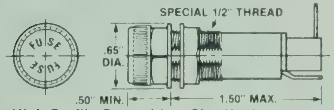
***Low Profile Body will accept either Fingergrip or Screwdriver Slot Knob.

DIMENSION DRAWINGS

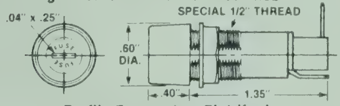
Low Profile Fingergrip Knob



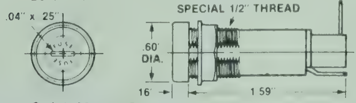
Rear Mount Fingergrip Knob



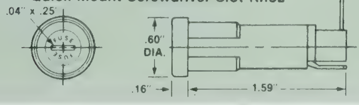
High Profile Screwdriver Slot Knob



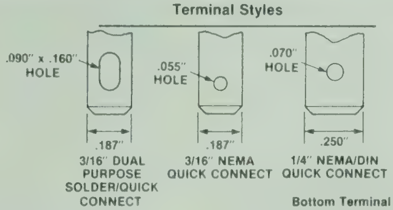
Low Profile Screwdriver Slot Knob



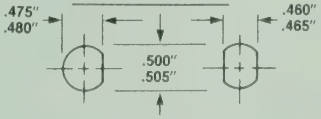
Quick Mount Screwdriver Slot Knob



Terminal Styles

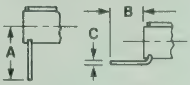


Suggested Mounting Holes



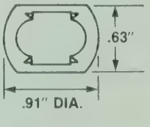
Bottom Terminal

Right Angle Straight

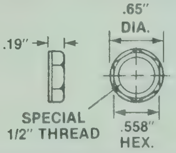


	A	B	C
.187″ QC	.53″	.30″	.020″
.250″ QC	.59″	.36″	.032″

"Push-On" Type Retaining Nut for Quick Mount Fuseholder



Plastic Hex Nut with Flange



FOR 3AG, 5X20mm OR 2AG FUSES

Flip-Top Shock-Safe Panel Mount Type

Shock-Safe design eliminates any possibility of electrical shock, per IEC Standards 257 and 65. Fuse carrier holds spare fuse for fast, easy fuse replacement and convenient servicing. Low profile design complements modern panels.

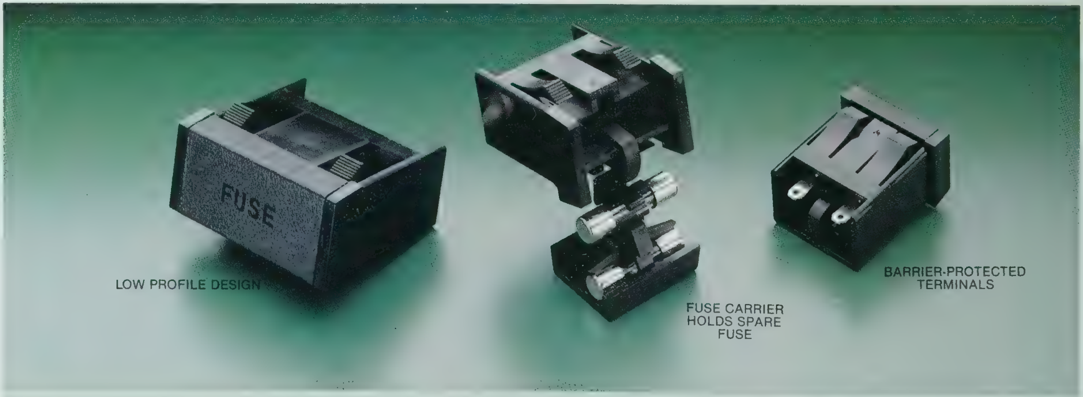
APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

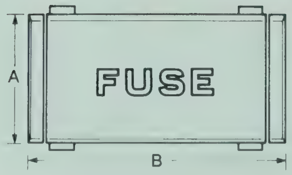
SPECIFICATIONS:
Electrical: Rating: See TABLE.
Insulation Resistance: 10,000 megohm minimum at 500 VDC.
Contact Resistance: Less than 0.01 ohm.
Mounting: Snap-in mounting. No hardware required. Panel thickness range: .032″ through .125″.
Molded Parts: Thermoplastic (UL 94V0) black standard (other colors available as special).
Fuse Carrier: Springloaded. Unlocks with a press of the finger. Locks into place to prevent accidental circuit interruption. Permanently attached to fuseholder body to prevent loss. Extracts fuse from live terminals. Holds spare fuse.
Terminals: Copper alloy, tin plate. Accepts quick-connect or solder.
Ambient Temperature: – 40 °C to + 85 °C.
Vibration: 10-55-10 Hz at .06″ double amplitude (Method 201, MIL-STD-202).

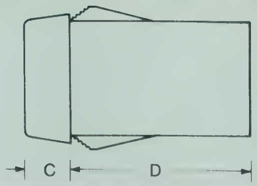
PATENTS: Patented.

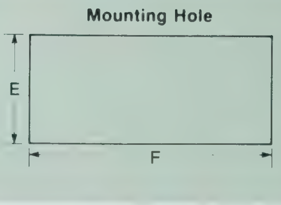
ORDERING INFORMATION:

Catalog Number	Fuse Size	Q.C. Terminals	Max. Amps At 250 V.	A	B	C	D	E ±.005″	F ±.005″
346877	3AG	.250″ X .032″ .072″ Dia. Hole	15	.75″	1.5″	.27″	1.04″	.688″	1.445″
286677	5 X 20mm	.187″ X .032″ .055″ Dia. Hole	10	.70″	1.03″	.26″	.94″	.625″	.953″
286377	2AG	.110″ X .020″ .048″ Dia. Hole	10	.61″	.85″	.20″	.87″	.550″	.775″









FOR 2AG FUSES

Shock-Safe Panel Mount Type

Newest and smallest of the 2AG fuseholder family. Popular screwdriver slot knob style provides low profile which complements modern panels. Shock safe design eliminates any possibility of electrical shock, per IEC Standards 257 and 65.

APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

SPECIFICATIONS:
Electrical: Rated at 10 amperes for any voltage up to 300 volts.
Insulation Resistance: 10,000 megohm minimum at 500 VDC.
Contact Resistance: Less than .005 ohms average at currents up to 1 ampere.
Dielectric Strength: 4000 volts terminal to panel, 3000 volts terminal to terminal.

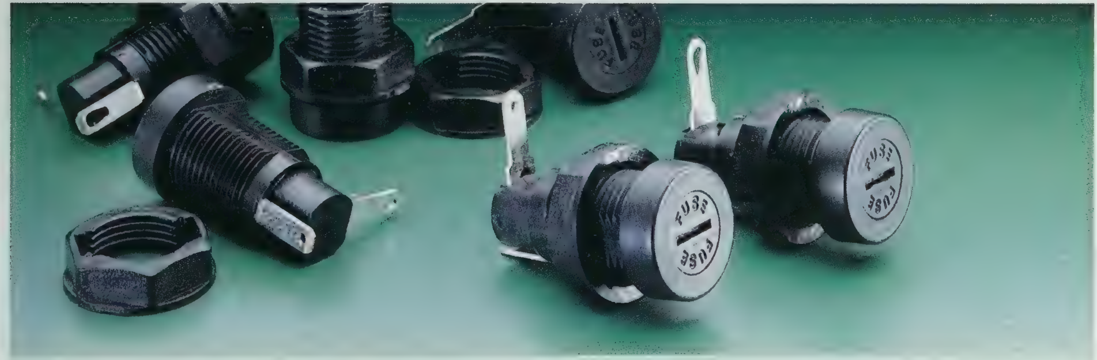
Mounting: Withstands 10 lb.-in. mounting torque. Maximum panel thickness is .250″.
Molded Parts: Body, knob, and hex nut material: Black, glass reinforced thermoplastic.
Knob: Screwdriver slot, fuse extractor type with nickel-plated, beryllium copper insert. Stainless steel spring.

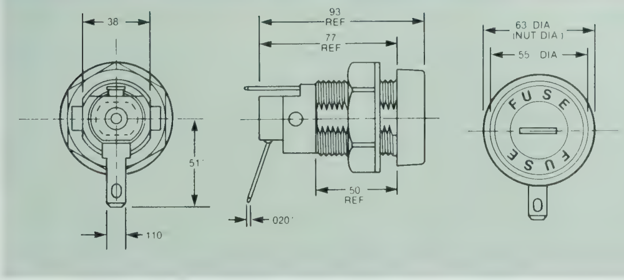
ORDERING INFORMATION:

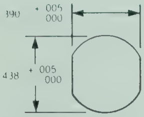
Catalog Number	Type of Terminal
245 001	Solder/Q.C. Terminal
245 002	NEMA Q.C. Terminal

Terminals: Brass. Tin-plated. Solder/Q.C. Terminals accept soldered wire or a .110″ quick-connect receptacle. The NEMA-style .110″ Q.C. terminal has a .048″ hole.
Ambient Temperature: – 40 °C to + 85 °C.
Hardware: Standard fuseholders are supplied with a thermoplastic hex nut, unassembled. To order with a lockwasher (L), and/or neoprene panel washer (N), add the appropriate suffix (L, N, or LN) to the catalog number. Example: 245001LN is a holder with lockwasher and neoprene panel washer in addition to the hex nut.

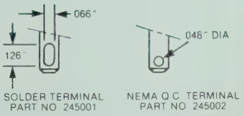
PATENTS: Patented.







MOUNTING HOLE



TERMINAL DETAIL

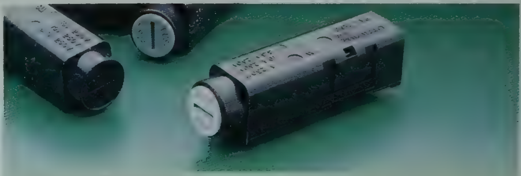
FOR 3AG, 5X20mm OR MIDGET FUSES

Shock-Safe For 3AG or 5X20mm Fuses P.C. Board Type

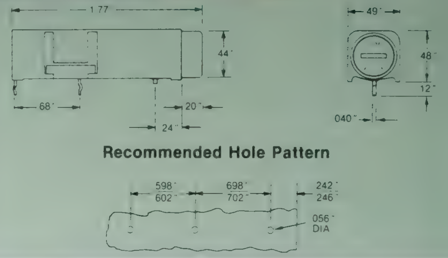
Similar to shock-safe fuseholders shown on preceding page but designed for P.C. board mounting. Shock-safe design per IEC Standards 257 and 65. Two different knob styles available for use with 3AG (¼″ × 1¼″) or 5 × 20mm fuses.

APPROVALS: Recognized under the Components Program of Underwriters Laboratories (16A, 250V).
Certified by CSA (15A, 250V).
SEMKO approved (6.3A, 250V).
VDE approved (10A, 250V).

SPECIFICATIONS:
Electrical: Rating: See APPROVALS.
Insulation Resistance: 10,000 megohm minimum at 500 VDC.
Contact Resistance: Less than .005 ohms average at a current of one ampere.
Dielectric Strength: 4000 volts minimum.
Mounting: Intended for soldering to printed circuit boards.
Molded Parts: Body Material: Black glass-filled thermoplastic (UL 94V0).
Knob Material: Grey or black glass-filled thermoplastic (UL 94V0).
Knob: Screwdriver slot, fuse extractor type with nickel-plated copper alloy insert. Spring-loaded, bayonet style.
Terminals: Brass. Tin-plated.
Ambient Temperature: −40°C to +85°C.



Reference Dimensions:



ORDERING INFORMATION:

Catalog Number	Fuse Size
345 101	¼″ × 1¼″ Fuses
345 121	5 × 20mm Fuses

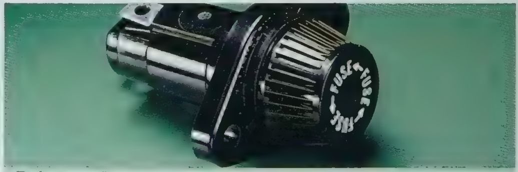
Body only: **345** 101-010
Knob only: **345** 101-020 (¼″ × 1¼″) Grey;
345 121-020 (5 × 20mm) Black.

for Midget Fuses Panel Mount Type

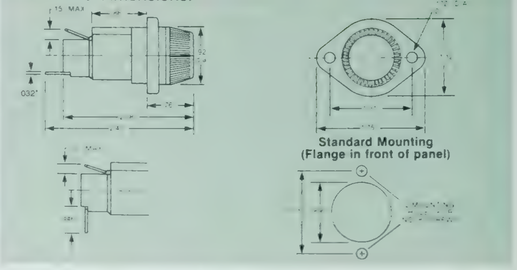
Two panel mount fuseholder designs are available for supplementary or Class CC branch circuit protection. Class CC fuses have a rejection feature on one end cap which mates with the rejection feature of Littelfuse Class CC fuse blocks and fuseholders to prevent the installation of fuses with lower voltage ratings or interrupting ratings.

APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

SPECIFICATIONS:
Electrical: Rated at 30 amperes for any voltage up to 600 volts.
Dielectric Strength: 4000 volts minimum.
Mounting: Flange mounting either in front of or behind panel. Watertight version must be front panel mounted. Maximum panel thickness is .75″.
Molded Parts: Black thermoplastic (UL 94V0).
Knob: Screw type, with engraved markings: unfilled characters (**571** 007, **571** 008, **571** 007P, **571** 008P), light blue characters (**571** 027, **571** 028, **571** 027P, **571** 028P).
Terminals: Brass. Tin-plated. Combination solder and ¼″ Quick-Connect. Side terminal has .125″ diameter hole. Bottom terminal has .156″ × .124″ elongated hole.
Ambient Temperature: −40°C to +85°C.
Hardware: **571** 007, **571** 008, **571** 027, **571** 028, **571** OCC and **571** RCC, none; **571** 007P, **571** 008P, **571** 027P, **571** 028P, **571** OCCP and **571** RCCP, two O-rings for watertight seal per MIL-F-19207.



Reference Dimensions:



ORDERING INFORMATION

Catalog Number		Bottom Terminal	Fuse Length Range*
Standard	**Watertight**		
571 027 **571** 028	**571** 027P **571** 028P	Straight Rt. Angle	$1\frac{5}{16}''$ – $1\frac{3}{8}''$
571 007 **571** 008	**571** 007P **571** 008P	Straight Rt. Angle	$1\frac{13}{32}''$ – $1\frac{1}{2}''$
571 OCC **571** RCC	**571** OCCP **571** RCCP	Straight Rt. Angle	$1\frac{1}{2}''$

*Fuse diameter is $\frac{13}{32}''$

FOR 3AG FUSES

Low Profile Snap Mount Type

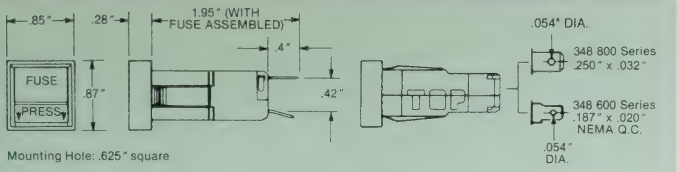
APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

SPECIFICATIONS:
Electrical: 348 Series: Rated at 15 amps for any voltage up to 250 volts.
334 Series: Rated at 15 amps at lamp voltage shown below.
Dielectric strength: 1500 volts minimum.
When designing indicating type fuseholders into a circuit, consideration should be given to the resistance of fractional amperage fuses and the parallel resistance of the indicator lamp and its resistor.

Mounting: Panel thickness range: .031″ through .125″.
Molded Parts: Black thermoplastic body (UL 94V0). Thermoplastic bezel, cap and lens (UL94V2) See tables below for colors.
Terminals: Brass. Tin-plated.
Ambient Temperature:
Non-indicating: −40°C to +85°C.
Indicating: −40°C to +60°C.
Fuse Installation: Insert a fuse into the cap and push the assembly into the body until it latches. Press in and down to unlatch for removal.

PATENTS: Patented.

348 000 Series


.85″
.28″
1.95″ (WITH FUSE ASSEMBLED)
.4″
.054″ DIA.
FUSE
PRESS
.87″
.42″
TOP
348 800 Series .250″ x .032″
348 600 Series .187″ x .020″ NEMA Q.C.
.054″ DIA.

Mounting Hole: .625″ square

ORDERING INFORMATION

Six-Digit Catalog Numbers Consist of:

Series Number	Terminal Style	Bezel Color	Cap Color
— — —	—	—	—
348 for 3AG Fuses	**6** for $\frac{3}{16}$″ wide NEMA Q.C. Terminal **8** for ¼″ wide	**1** for Red **2** for Green **3** for Yellow **4** for Blue **5** for White **7** for Black **9** for Grey	**1** for Red **2** for Green **3** for Yellow **4** for Blue **5** for White **7** for Black **9** for Grey

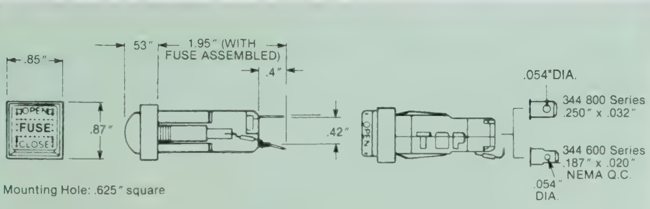
Example: 3 4 8 6 1 1

Blown-Fuse Indicating Snap Mount Type

APPROVALS AND SPECIFICATIONS: See above.

344 600 Series
344 800 Series

Standard body and bezel color is black; other bezel colors available on special order.


.85″
.53″
1.95″ (WITH FUSE ASSEMBLED)
.4″
.054″DIA.
OPEN
FUSE
CLOSE
.87″
.42″
OPEN
TOP
344 800 Series .250″ x .032″
344 600 Series .187″ x .020″ NEMA Q.C.
.054″ DIA.

Mounting Hole: .625″ square

ORDERING INFORMATION:

Catalog Number						
$\frac{3}{16}$″ Q.C. Terminals	¼″ Q.C. Terminals	Lamp Type	Lamp Voltage	Lamp Current	Resistor	Lens Color
344 601	344 801	Incandescent	6	40 ma	No	Amber
344 602	344 802	Incandescent	14	80 ma	No	Amber
344 603	344 803	Incandescent	28	40 ma	No	Amber
344 604	344 804	Neon	120	1.2 ma	Yes	Clear
344 605	344 805	Neon	240	.3 ma	Yes	Clear

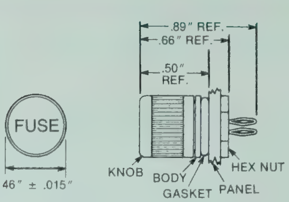
FOR MICROFUSE PLUG-IN FUSES

RF-Shielded Front Panel Mount Type/Rear Panel Mount Type

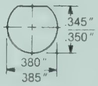
Space Saving. RF-shielded design holds miniature microfuse. Screw-on drip-proof knob construction permits use when presence of moisture exists at front of panels.

SPECIFICATIONS:
Electrical: Rated at 5 amperes for any voltage up to 125 volts.
Mounting: Front panel mount, maximum panel thickness: .093″. Rear panel mount, maximum panel thickness: .125″.
Molded Parts: Black thermoset.
Housing, Knob and Nut: Aluminum, untreated. Chromate finish for RF shielding or anodized finish (non-RF shielding) available on special order.
Mounting Gasket: Neoprene or conductive silicone.
Seal: Buna "N" O-ring inside the knob.
Terminals: Beryllium copper. Silver plated.
Ambient Temperature: −40°C to +125°C.
Hardware: Hex nut or knurled nut as shown, unassembled.

Front Panel Mount
282 000 Series



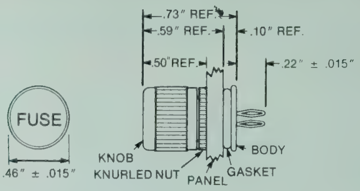
Mounting Hole



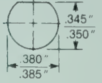
ORDERING INFORMATION:

Catalog Number	Gasket Type
282 001	Neoprene
282 007	Conductive

Rear Panel Mount
282 000 Series



Mounting Hole



ORDERING INFORMATION:

Catalog Number	Gasket Type
282 002	Neoprene
282 008	Conductive

FOR 3AG FUSES

Traditional Panel Mount Type

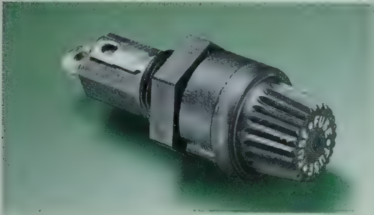
UL CSA QPL[0]

APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

SPECIFICATIONS:
Electrical: Rated at 20 amperes for any voltage up to 250 volts.
Dielectric strength: 2400 volts minimum.
Mounting: Withstands 15 lb.-in. mounting torque; maximum panel thickness: .187″.
Molded Parts: Black thermoplastic (UL 94V0)
Knob: Bayonet style with white lettering.
Terminals: Copper & copper alloy. Tin plated, except ¼″ Quick-Connect terminals are nickel plated.
Ambient Temperature: −40°C to +85°C.
Hardware: Standard fuseholders are supplied with a neoprene washer and a plastic hex nut unassembled. To order with a lockwasher (L) and/or drip-proof seal (P), add the appropriate suffix (L, P, or PL) to the catalog number. Example: **342** 004PL is a holder with lockwasher and drip-proof seal in addition to neoprene washer and hex nut.

FUSEHOLDERS TO MIL SPEC:[0] See Military Section.

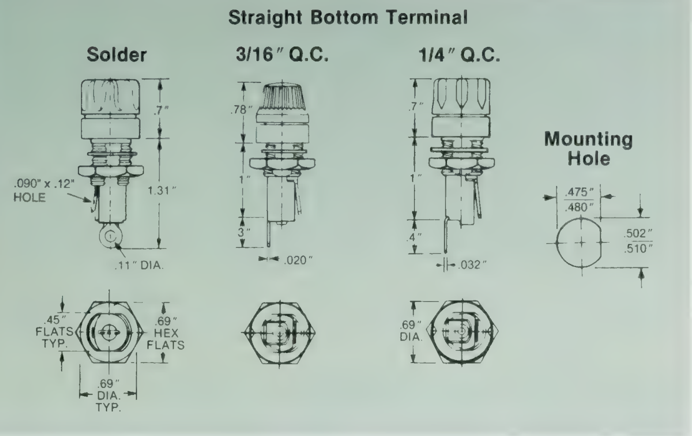
342 000 Series



Knurled knob shown. Fluted knob also available. See table below.

ORDERING INFORMATION:

Catalog Number		
Fluted Knob	Knurled Knob	Type of Terminal
342 014	**342** 012	Solder
342 038	**342** 058	3/16″ Q.C.
342 838	**342** 858	1/4″ Q.C.

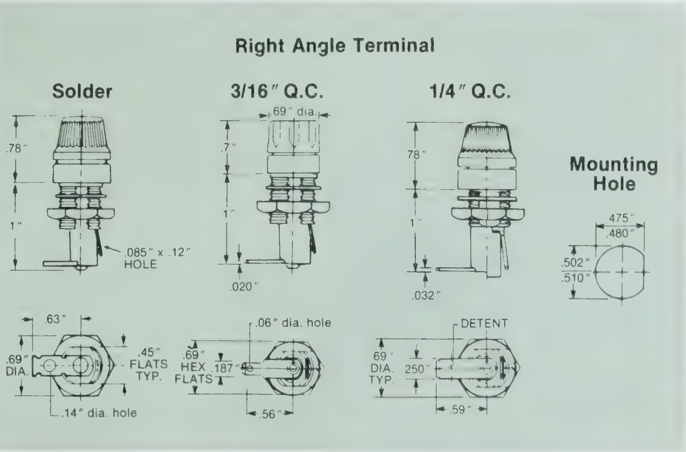


342 000 Series

Fluted knob shown. Knurled knob also available. See table below.

ORDERING INFORMATION:

Catalog Number		
Fluted Knob	Knurled Knob	Type of Terminal
342 004	**342** 022	Solder
342 028	**342** 048	3/16″ Q.C.
342 828	**342** 848	1/4″ Q.C.



FOR 3AG FUSES

Blown-Fuse Indicating Panel Mount Type QPL[0]

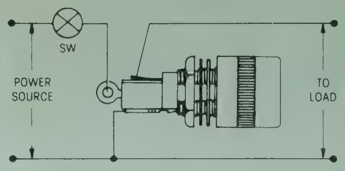
APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

SPECIFICATIONS:
Electrical: Rated at 20 amperes at lamp voltage as shown below. Dielectric withstanding voltage exceeds 1500 volts. All fuseholders are supplied with a resistor. When designing indicating type fuseholders into a circuit, consideration should be given to the resistance of fractional amperage fuses and the parallel resistance of the indicator lamp and its resistor.
Mounting: Withstands 15 lb.-in. mounting torque. Maximum panel thickness is .250″.
Molded Parts: Black thermoset (UL 94V0), except lens is thermoplastic (UL 94V2). See Table below for lens color.
Knob: Bayonet style.
Terminals: Copper & copper alloy. Tin plated.
Ambient Temperature: −40°C to +85°C.
Hardware: Neoprene washer, lockwasher & hex nut unassembled.
Option: O-ring available assembled to knob for drip-proof seal. Add suffix "P" to part number (example **344** 125P).

FUSEHOLDERS TO MIL SPEC:[0] See Military Section.

PILOT LIGHT FEATURE: This fuseholder may also serve as a pilot light. In an application of this kind, the indicator light is on when the circuit is on, and the light is off when the fuse is blown. This is the reverse of the usual application of indicating fuseholders. To order this fuseholder with the pilot light feature, change the Catalog Series Number from **344** to **343**.

Wiring for Pilot Light
343 000 Series

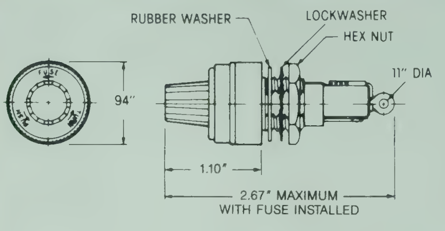


ORDERING INFORMATION:

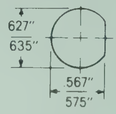
Catalog Number 344 000 Series	344 400 Series	Voltage Range	Lamp Type	Lamp Current Rating	Lens Color
344 006	**344** 401	2.5 to 7	6V Incandescent	.20 amp	Amber
344 012	**344** 402	7 to 16	14V Incandescent	.08 amp	Amber
344 024	**344** 403	16 to 32	28V Incandescent	.04 amp	Amber
344 125	**344** 404	100 to 125	Neon	.002 amp	Clear
344 250	**344** 405	200 to 250	Neon	.002 amp	Clear

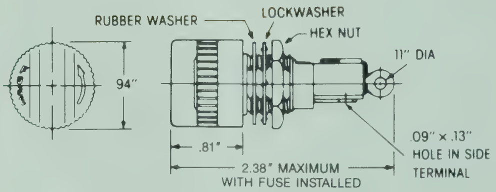
344 400 Series

344 000 Series



Mounting Hole




RUBBER WASHER
LOCKWASHER
HEX NUT
11" DIA
94"
.81"
2.38" MAXIMUM WITH FUSE INSTALLED
.09" × .13" HOLE IN SIDE TERMINAL

FOR 3AG FUSES

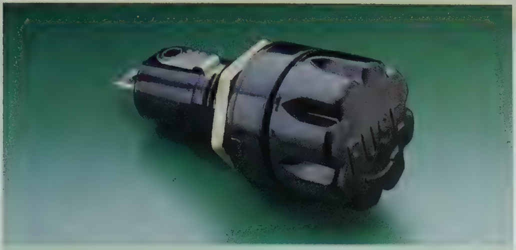
Watertight Panel Mount Type QPL①

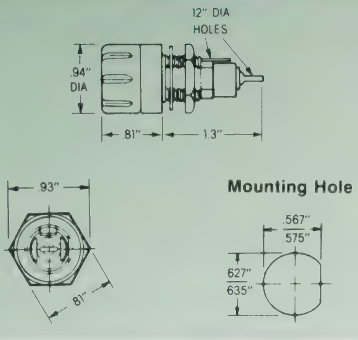
APPROVALS: Recognized under the Components Program of Underwriters Laboratories.

SPECIFICATIONS:
Electrical: Rated at 20 amperes for any voltage up to 250 volts.
Dielectric strength: 1500 volts minimum.
Mounting: Withstands 15 lb.-in. mounting torque; maximum panel thickness is .250″.
Molded Parts: Black thermoset (UL 94V0).
Knob: Screw type.
Seal: O-rings provide a watertight seal on the front side of the panel per MIL-F-19207.
Terminals: Copper & copper alloy. Tin plated. Solder type.
Ambient Temperature: −40°C to +85°C.
Hardware: O-rings (2) and hex nut, unassembled.

FUSEHOLDERS TO MIL SPEC: ① See Military Section.

ORDERING INFORMATION:
Catalog Number: 342 006





RF Shielded/Watertight Panel Mount Type QPL①

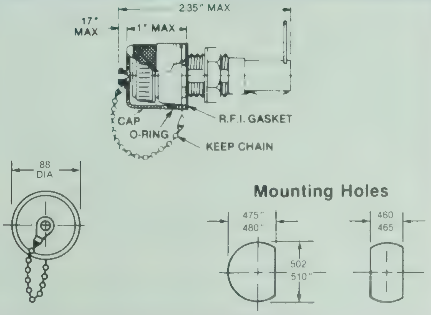
Radio frequency shielded fuseholders eliminate possible transmission or reception of RF signals through the hole in the chassis in which the fuseholder is mounted. These fuseholders comply with the watertight construction requirement of MIL-F-19207 and the shock-safe requirements of IEC 65 and 257. A rubber O-ring and conductive gasket maintain RF shielding and watertight construction.

SPECIFICATIONS: The basic fuseholder used is the **345** 603 Shock-safe holder.

FUSEHOLDERS TO MIL SPEC: ① See Military Section.

ORDERING INFORMATION:

Catalog Number	Brass Shielding Cap Finish
340 312	Nickel plated
340 313	Dull Black



FOR MICROFUSE PLUG-IN FUSES

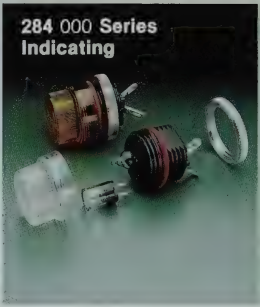
Blown-Fuse Indicating Panel Mount Type

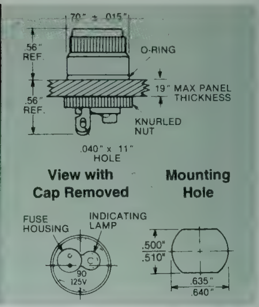
SPECIFICATIONS:
Electrical: Rated at 5 amperes within voltage ranges shown. NOTE: When designing indicating type holders into a circuit, consideration must be given to the resistance of fractional amperage fuses and the parallel resistance of the indicating lamp and its resistor.
Mounting: Withstands 10 lb.-in. mounting torque.
Molded Parts: Body: Black Thermoset (UL 94V0). Cap: Thermoplastic (UL 94V2).
Terminals: Brass, Tin plated.
Ambient Temperature: −40°C to +84°C.
O-Ring: Silicone rubber.
Hardware: Aluminum knurled nut, unassembled.

FUSEHOLDERS TO MIL SPEC: See Military Section.

ORDERING INFORMATION:

Catalog Number	Range in Volts	Type	Volts	Amps.	Knob Color
284 004	2½ to 7	Incandescent	6	0.20	Amber
284 005	7 to 16	Incandescent	14	0.08	Amber
284 006	16 to 32	Incandescent	28	0.04	Amber
284 003	100 to 125	Neon	—	0.002	Clear


284 000 Series Indicating



FOR MICROFUSE OR PICO II™ FUSES

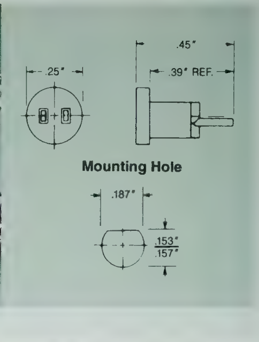
"Push-On" Retaining Nut

Chasis Mount Type

Fuseholder will accept Littelfuse Microfuses and PICO II™ fuses (rated to 5 amperes) with .025" diameter leads.

SPECIFICATIONS:
Electrical: Rated at 5 amperes for any voltage up to 125 volts.
Mounting: Maximum panel thickness is .09".
Molded Parts: Black Thermoset.
Terminals: Beryllium Copper, Silver-plated.
Ambient Temperature: −40°C to +125°C.
Hardware: "Push-On" retaining nut.

281 001 Series "Push-On"



FOR MICROFUSE OR PICO II™ FUSES

Vertical/Horizontal

P.C. Board Mount Type

Fuseholder will accept Littelfuse Microfuses and PICO II™ fuses (rated to 5 amperes) with .025" diameter leads.

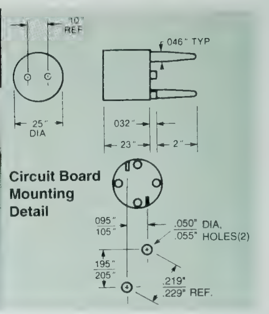
SPECIFICATIONS:
Electrical: Rated at 5 amperes for any voltage up to 125 volts.
Molded Parts: White Thermoplastic.
Terminals: Copper Alloy.
Ambient Temperature: −40°C to +100°C.

ORDERING INFORMATION:

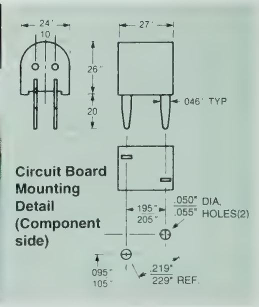
Catalog Number	Terminal Plating	Mounting
281 005	Silver ⁰	Vertical
281 008	Tin	Vertical
281 007	Silver ⁰	Horizontal
281 010	Tin	Horizontal

⁰ Recognized

281 000 Series Vertical



281 000 Series Horizontal



FOR LOW VOLTAGE 3AG OR SFE FUSE APPLICATIONS

Twist-Lock In-Line Type

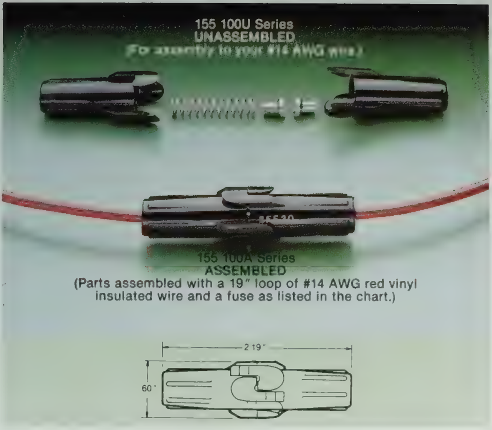
SPECIFICATIONS:
Electrical: Intended for use at 32 volts or less with fuses rated up to 20 amperes when the proper spring is installed for fuse size.
Molded Parts: Black thermoplastic (UL 94V2).
Body halves have a .14″ diameter hole for insulated wire.
Ambient Temperature: −40 °C to +75 °C.
Contact Rivet: Brass. Tin finish. Designed to accomodate #14 AWG stranded wire.

OPTIONS:
150 215 is similar to **155** 120A except no fuse is supplied. It is intended for use with 3AG fuses rated up to 20 amperes.

UNIVERSAL IN-LINE FUSEHOLDER 155 100:
Supplied with 8″ loop of #14 AWG red vinyl insulated wire and two springs: a long spring for fuses thru SFE9 and short spring for SFE14 and SFE20.

Fuseholders with other wire sizes or lengths available on special order.

PATENTS: Patented



(Parts assembled with a 19″ loop of #14 AWG red vinyl insulated wire and a fuse as listed in the chart.)

ORDERING INFORMATION:

Unassembled		Assembled	
Catalog Number	For Fuse Size	Catalog Number	Fuse Installed
155 104U	1/4″ × 5/8″	**155** 104A	SFE 4
155 106U	1/4″ × 3/4″	**155** 106A	SFE 6
155 17.5U	1/4″ × 7/8″	**155** 17.5A	SFE 7 1/2
155 109U	1/4″ × 7/8″	**155** 109A	SFE 9
155 114U	1/4″ × 1 1/16″	**155** 114A	SFE 14
155 120U	1/4″ × 1 1/4″	**155** 120A	SFE 20

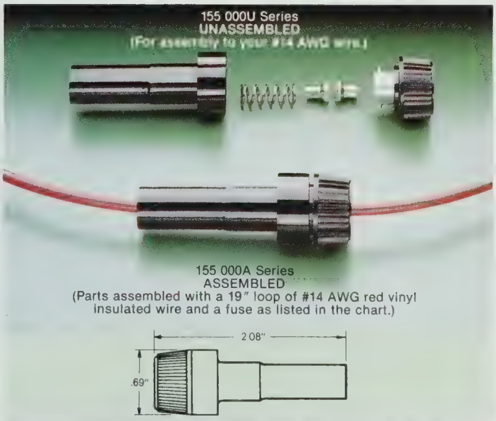
Heavy-Duty Bayonet Knob In-Line Type

SPECIFICATIONS:
Electrical: Intended for use at 32 volts or less with fuses rated up to 20 amperes when the proper spring is installed for fuse size.
Molded Parts: Body and knob are black thermoset (UL 94V0). Both body and knob have a .20″ diameter hole for insulated wire.
Knob: Bayonet-lock type metal insert.
Ambient Temperature: −40 °C to +125 °C.
Contact Rivet: Brass. Tin plated. Designed to accomodate #14 AWG stranded wire.

OPTIONS:
150 079 is similar to **155** 020A except no fuse is supplied. It is intended for use with 3AG fuses rated up to 20 amperes.

UNIVERSAL IN-LINE FUSEHOLDER 150 145:
Supplied with 15″ loop of #14 AWG red vinyl insulated wire and three springs in different lengths to accommodate SFE size fuses.

Fuseholders with other wire sizes or lengths available on special order.



(Parts assembled with a 19″ loop of #14 AWG red vinyl insulated wire and a fuse as listed in the chart.)

ORDERING INFORMATION:

Unassembled		Assembled	
Catalog Number	For Fuse Size	Catalog Number	Fuse Installed
155 004U	1/4″ × 5/8″	**155** 004A	SFE 4
155 006U	1/4″ × 3/4″	**155** 006A	SFE 6
155 07.5U	1/4″ × 7/8″	**155** 07.5A	SFE 7½
155 009U	1/4″ × 7/8″	**155** 009A	SFE 9
155 014U	1/4″ × 1 1/16″	**155** 014A	SFE 14
155 020U	1/4″ × 1 1/4″	**155** 020A	SFE 20

SPECIAL TYPES

For Autofuse® Fuses In-Line Type

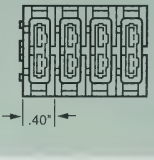
SPECIFICATIONS:
Electrical: Intended for use with 32-volt Autofuse® fuses rated to 20 or 30 amperes depending on wire size and terminal combinations.
Mounting: Capable of snap-mounting to panel from rear. Fuseholders interlock for multiple mounting.
Molded Parts: Black thermoplastic (UL 94V2).
Terminals: Brass. Tin-plated. Snap-lock into body.
Ambient Temperature: −40°C to +85°C.
Wire: Stranded with PVC insulation, black #14 AWG for **155** 300 **Series** and orange #10 AWG for **155** 400 **Series.**

PATENTS: Patented.

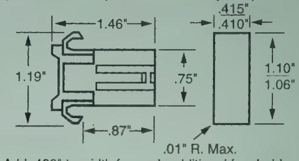
ORDERING INFORMATION:

Catalog Number			
Unassembled	Assembled with 8" Wire Loop, No Fuse	Assembled with 8" Wire Loop and Fuse	Fuse Amperage Rating
155 320U (Terminals designed for #14 AWG stranded wire and marked ''14''.)	**155** 300 (#14 wire/ terminals rated to 20A)	**155** 303A	3
		155 304A	4
		155 305A	5
		155 37.5A	7.5
		155 310A	10
		155 315A	15
		155 320A	20
155 430U (Terminals designed for #10 AWG stranded wire and marked ''10''.)	**155** 400 (#10 wire/ terminals rated to 30A)	**155** 425A	25
		155 430A	30

Typical Multiple Mounting (fuseholders interlocked)



Recommended Panel Mounting Hole (.04" / .078" thick panel)



Add .400" to width for each additional fuseholder

For MINI® Fuses In-Line Type — Easy Crimp Fuseholder

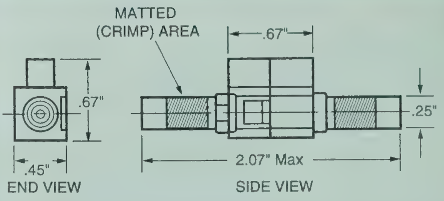
SPECIFICATIONS:
Terminals: Copper Alloy/Tin plated.
Body: Black thermoplastic.
Operating Temp.: −40°C to +105°C.

Use standard crimping tool and crimp the matted area to secure wire. (Possible crimp tool — Ideal #30-428 [Toothed Die slot] or equivalent.)

ORDERING INFORMATION:

Catalog Number	Description
153 002	20A Max. Rating — Terminals will accept #16 – 22 AWG (1.0 – .33 mm²) stranded wire (use appropriate wire size based on fuse usage). For example — Use #16 AWG wire for 20A fuse.
153 003	30A Max. Rating — Terminals will accept #10 – 14 AWG (5.0 – 2.0 mm²) stranded wire (use appropriate wire size based on fuse usage). For example — Use #10 AWG wire for 30A fuse.

Tool For Fuse Removal or Replacement: Part No. 097024



Overall height with fuse installed is 1.0" Ref.

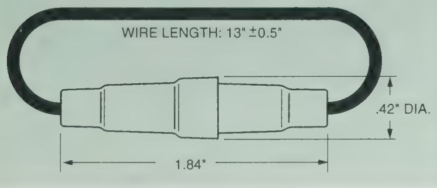
SPECIAL TYPES

2AG or 5X20mm Inline Fuseholders

SPECIFICATIONS:
Electrical: This fuseholder, part number 150274, is intended for use with 2AG and 5×20mm fuses. Maximum current ratings are 5 amperes at 32V for the 2AG size fuses and 10 amperes at 32V for the 5×20mm size fuses.
Body: Black thermoplastic.
Terminals: Brass.
Wire: 16 Awg size; nominal o.d. 0.104″; color, red.
Lead Pull Test: Will withstand 10 lb. pull.
Ambient Temperature: −40°C to +80°C.

150274

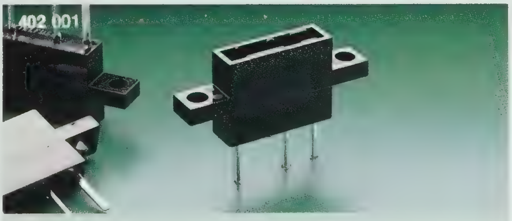
Reference Dimensions:



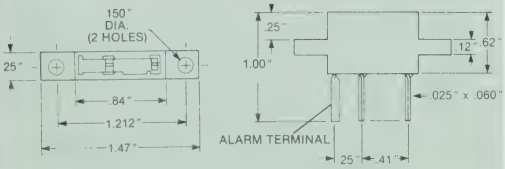
For Indicating/Alarm Fuses Panel Mount Type

APPROVALS: Recognized under the Components Program of Underwriters Laboratories.

SPECIFICATIONS:
Electrical: Rated at 10 amperes for any voltage up to 125VAC, 60VDC.
Molded Parts: Black phenolic with UL 94V0 flammability rating.
Terminals: Brass. Tin-plated, wire wrap type.
Ambient Temperature: −40°C to +85°C.



Reference Dimensions:



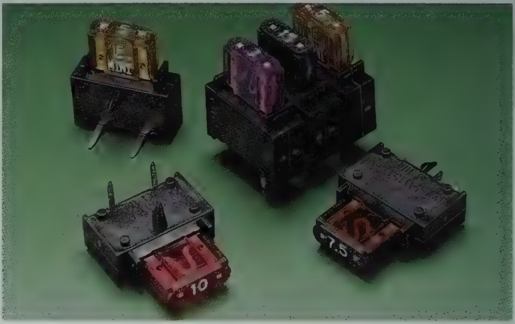
SPECIAL TYPES

For MINI® Fuses P.C. Board Mount Type

The MINI® Fuse P.C. board fuseholders bring the reliability and availability of the plug-in 32V MINI® Fuse to the circuit board. Vertical and horizontal mounting of units is offered to meet a variety of requirements in which circuit protection is desired for a low DC voltage P.C. board application. The fuseholder body has "standoffs" to accomodate board washing and incorporates a unique "board lock" anchor to maintain a firm mechanical bond to the PCB during fuse insertion and removal.

APPROVALS: Recognized under the Components Program of Underwriters Laboratories for 15 amperes and certified by CSA for 10 amperes.

SPECIFICATIONS:
Electrical: Rated 32 VDC.
Mounting: Three fuseholders can be mounted side by side (stacked) and operated at rated current. Contact factory for applications involving more than three stacked fuseholders.
Molded Parts: Black thermoplastic body (UL 94VO).
Terminals: Copper Alloy. Tin Plated.
Ambient Temperature: −40°C to +85°C.
Compatibility: Standard .062″ PCB thickness.

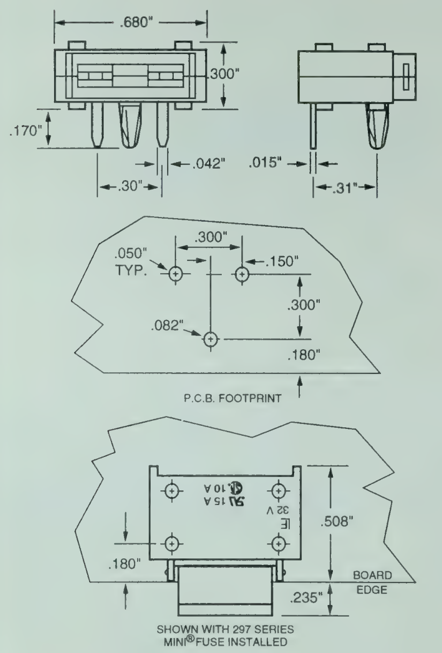


ORDERING INFORMATION:

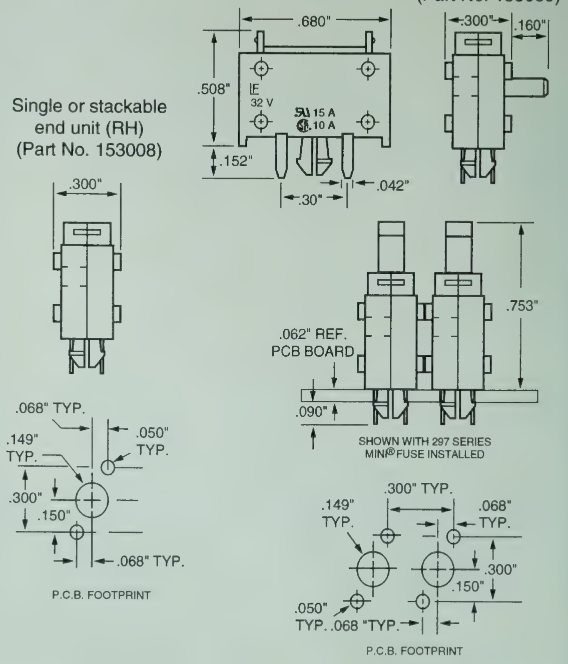
Catalog Number	Description
153 007	Horizontal Mount P.C.B. Holder
153 008	Single or Stackable (End Unit) Vertical Mount P.C.B. Holder
153 009	Stackable Vertical Mount P.C.B. Holder
097024	Removal or Replacement Tool

Tool For Fuse Removal or Replacement: Part No. 097024.

HORIZONAL MOUNT
(Part No. 153007)

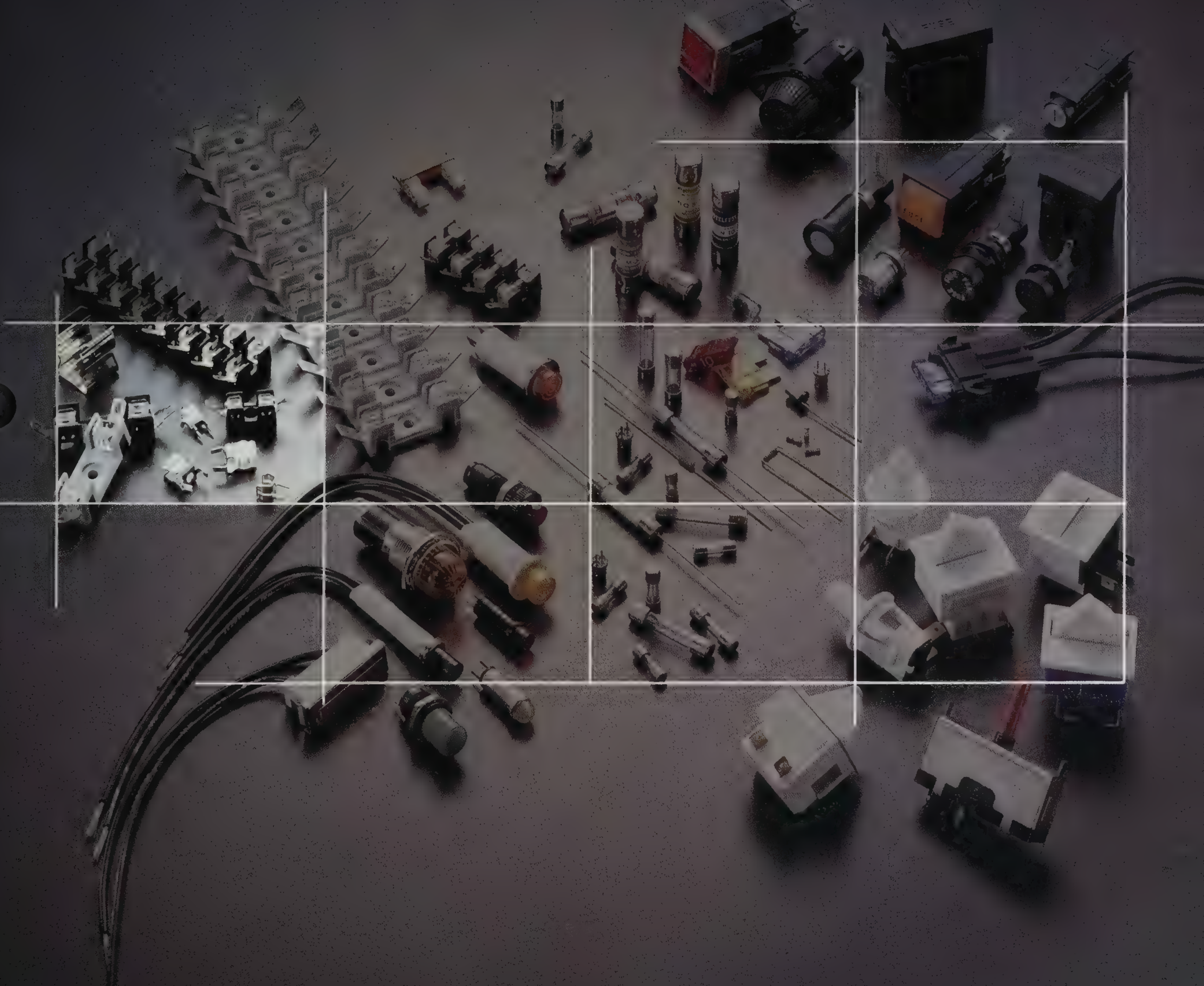


VERTICAL MOUNTS


Single or stackable end unit (RH)
(Part No. 153008)

Stackable unit
(Part No. 153009)

FUSE BLOCKS & CLIPS



FOR NANO^{2}™ SURFACE MOUNT FUSES

SMF Omni-Blok® Fuse Block Molded Base Type

The SMF Omni-Blok® Fuseholder permits quick and easy replacement of Nano^{2}™ SMF surface mount fuses. The fuse block and pre-installed fuse combination can be placed on the PC board in one efficient manufacturing operation. Fuse replacement is accomplished without exposing the PC board to the detrimental effects of solder heat. Refer to notes 1 and 2, below, for fuse/fuseholder combinations available.

APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

SPECIFICATIONS:
Electricals: 7 Amperes, 125 Volts.
Molded Parts: Thermoplastic (94V0).
Terminals: Tin/Lead Alloy Plated Beryllium Copper.
Ambient Temperature: −55°C to +125°C.
Shock: MIL-STD-202, Method 213, Test Condition 1 (100 G's peak for 6 milliseconds).
Vibration: MIL-STD-202, Method 201 (10−55 Hz).
Thermal Shock: MIL-STD-202, Method 107, Condition A (200 cycles: 30 minutes at −55°C, 30 minutes at 125°C).
Soldering parameters (Fuse Installed):

Infrared —	500°F (260°C), 30 sec.	445°F (230°C), 30 sec.

Solderability: MIL-STD-202, Method 208.
Packaging: 16mm Tape and Reel for use with automatic pick and place equipment per EIA Standard 481. 1500 per reel.

PATENTS: Patented.

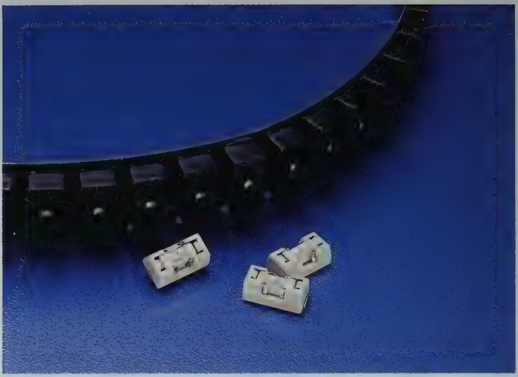
ORDERING INFORMATION:

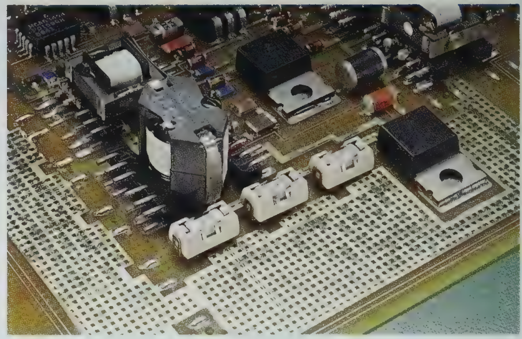
With Very Fast-Acting Fuse Installed

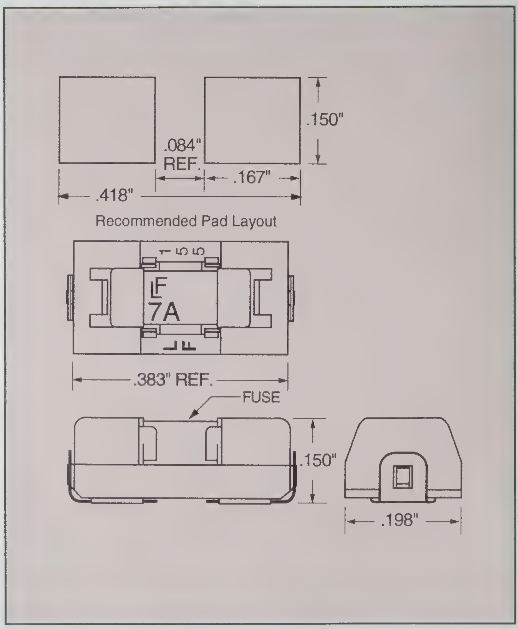
Catalog Number	Ampere Rating	Fuse Furnished ①
154.062	1/16	**453**.062
154.125	1/8	**453**.125
154.250	1/4	**453**.250
154.375	3/8	**453**.375
154.500	1/2	**453**.500
154.750	3/4	**453**.750
154 001	1	**453** 001
154 01.5	1.5	**453** 01.5
154 002	2	**453** 002
154 02.5	2.5	**453** 02.5
154 003	3	**453** 003
154 03.5	3.5	**453** 03.5
154 004	4	**453** 004
154 005	5	**453** 005
154 007	7	**453** 007

With Slo-Blo® Fuse Installed

Catalog Number	Ampere Rating	Fuse Furnished ②
154 001T	1	**454** 001
154 01.5T	1.5	**454** 01.5
154 002T	2	**454** 002
154 02.5T	2.5	**454** 02.5
154 003T	3	**454** 003
154 03.5T	3.5	**454** 03.5
154 004T	4	**454** 004
154 005T	5	**454** 005







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① [illegible] Series Fuse has silver plated end caps, installed to accommodate solder reflow process. Use 451 Series with tin/lead alloy plated end caps for replacement purposes, page 10.

② [illegible] Series Fuse has silver plated end caps installed to accommodate solder reflow process. Use 452 Series with tin/lead alloy plated end caps for replacement purposes, page 11.

FOR 2AG FUSES

Omni-Blok® Fuse Block Molded Base Type

This low profile Omni-Blok® design is available with a choice of solder type terminals, Q.C. terminals or P.C. board mountable terminals. The PCB design is offered with either tin plated brass terminals for normal applications or tin plated beryllium copper terminals for use in caustic environments. These fuse blocks feature individual barriers which reinforce the fuse clips while providing greater protection against clip damage and electrical shock. The unique design permits self alignment of clips to fuse cap. This, plus a one piece clip/terminal assures low contact resistance. Multiple pole units may be broken apart to obtain desired number of poles.

APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

SPECIFICATIONS:
Electrical: Solder Type — 10A, 300V.
Q.C. Type — 10A, 300V.
PCB Type — 10A, 300V.
Dielectric Strength: 1500V., Minimum.
Clip/Terminals: Tin Plated Spring Brass, except pn 254121 is Tin Plated Beryllium Copper.
Base: Black thermoplastic, glass reinforced with UL 94V0 flammability rating.
Ambient Temperature: −40°C to +85°C.

OPTIONS:
1. Other colors available on special order. Contact factory.
2. Two different style clips can be supplied for circuit identity or polarization. Contact factory.

PATENTS: Patented.

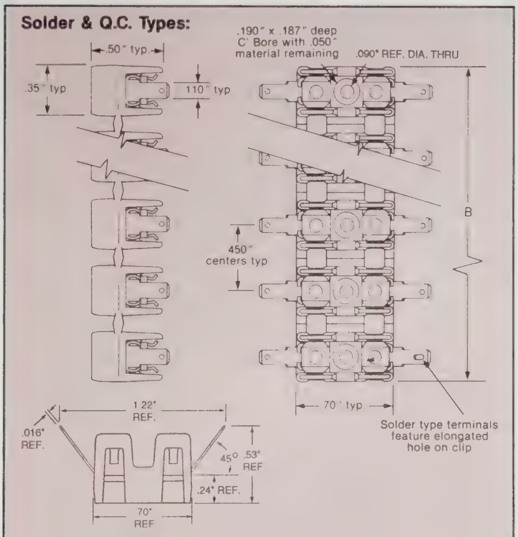
ORDERING INFORMATION:

Catalog Number Solder Type Terminals	Number of Poles	Typical Overall Width (B)	Clip/ Terminals
254 001	1	0.35″	Brass
254 002	2	0.80″	Brass
254 003	3	1.25″	Brass
254 004	4	1.70″	Brass
254 005	5	2.15″	Brass
254 006	6	2.60″	Brass
254 007	7	3.05″	Brass
254 008	8	3.50″	Brass

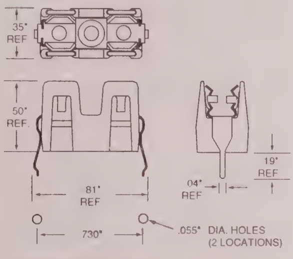
NEMA Style .110″ Q.C. Terminals	Number of Poles	Typical Overall Width (B)	Clip/ Terminals
254 201	1	0.35″	Brass
254 202	2	0.80″	Brass
254 203	3	1.25″	Brass
254 204	4	1.70″	Brass
254 205	5	2.15″	Brass
254 206	6	2.60″	Brass
254 207	7	3.05″	Brass
254 208	8	3.50″	Brass

P.C. Board Mount	Number of Poles	Typical Overall Width (B)	Clip/ Terminals
254 101	1	0.35″	Brass
254 121	1	0.35″	Beryllium Copper

Solder & Q.C. Types:



P.C. Board Mount Type:



Recommended Hole Pattern

FOR 5 X 20MM FUSES

Metric Omni-Blok® Fuse Block Molded Base Type

The metric Omni-Blok® fuse block, for 5 X 20mm size fuses, is a low profile design that is available with a choice of solder type terminals, NEMA style QC terminals or PC board mountable terminals. Each of these designs has tin plated brass terminals. A unique design feature provides self alignment of the clips to the fuse caps. This feature, plus a one piece clip/terminal design, assures low contact resistance. An anti-rotation feature is also available on the solder and QC terminal designs.

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and certified by CSA. VDE and Semko approvals are pending.

SPECIFICATIONS:

Electrical:	**UL/CSA**	**VDE/Semko, Pending**
Solder Type —	10A, 300V.	6.3A, 250V.
Q.C. Type —	10A, 300V.	6.3A, 250V.
PCB Type —	10A, 300V.	6.3A, 250V.

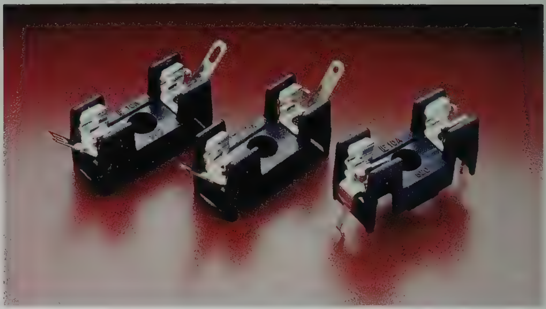
Dielectric Strength: 1500V., Minimum.
Clip/Terminals: Tin Plated Spring Brass
Base: Glass reinforced thermoplastic, UL 94VO flammability rating. Gray color (GY) for anti-rotational series, black color for all others.

Ambient Temperature: –40°C to +85°C.

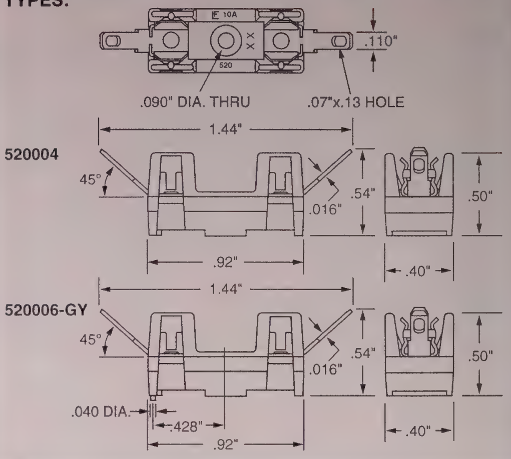
PATENTS: Patented.

ORDERING INFORMATION:

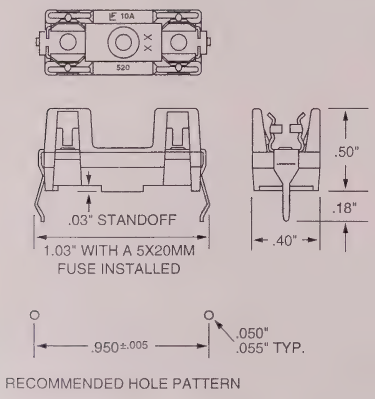
Catalog Number	Typical Overall Width	Clip/ Terminals	Anti-Rotation Boss
Solder Type Terminals			
520004	.40"	Brass	No
520006-GY	.40"	Brass	Yes
NEMA Style .110" Q.C. Terminals			
520003	.40"	Brass	No
520005-GY	.40"	Brass	Yes
PC Board Mount			
520101	.40"	Brass	No



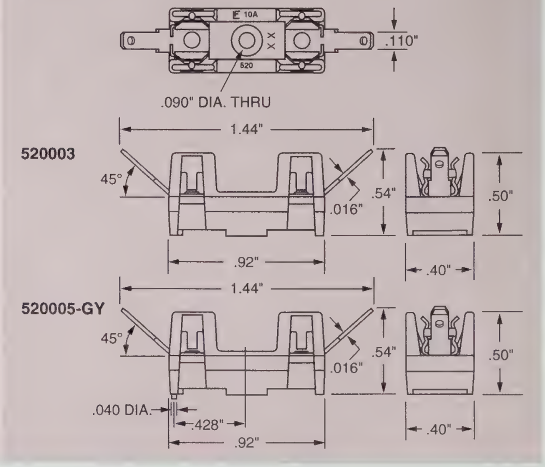
SOLDER TERMINAL TYPES:



P.C. MOUNT TYPE:
520101



Q.C. TERMINAL TYPES:



FOR 3AG FUSES

3AG Omni-Blok® Molded Base Type

A low profile fuse block featuring individual barriers which reinforce the fuse clips while providing greater protection against clip damage and electrical shock. The unique design permits self alignment of clips to fuse cap. This, plus a one piece clip/terminal assures low contact resistance. Higher current ratings have been attained using spring brass clips. With the exception of the two-pole unit, multiple pole units may be broken apart to obtain desired number of poles.

APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA up to 300V and at current ratings shown below.

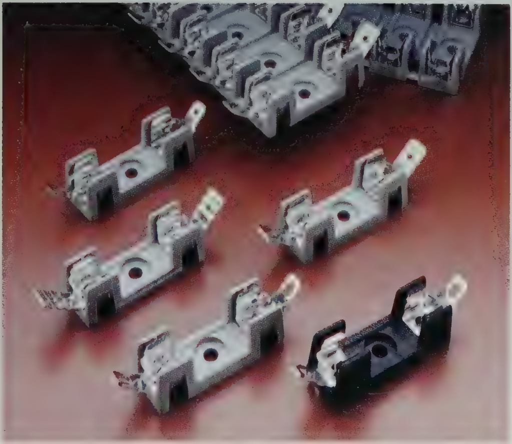
Series	Current Rating	
	U.L.	CSA
354 000	30A	30A
354 600	20A	20A
354 800	20A	20A
354 900	30A	25A
354 101-GY	15A	15A

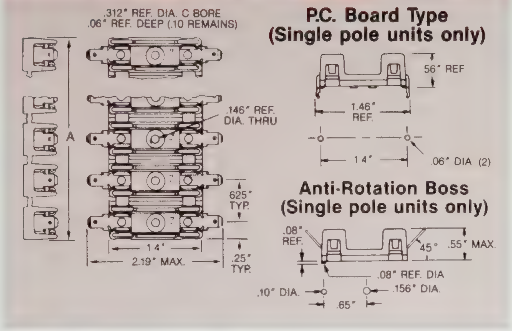
SPECIFICATIONS:
Dielectric Strength: 1500 volts minimum.
Clip/Terminals: Tin plated spring brass.
Base: Thermoplastic, glass reinforced. (Gray except Anti-Rotation series which is black.) UL 94V0 flammability rating.
Ambient Temperature: – 40 °C to + 85 °C.

ELECTRICAL SPECIFICATIONS:

Series or Catalog Number	Terminals	Rating
354 000	Solder	30A, 300V*
354 600	3/16" Q.C.	20A, 300V
354 800	1/4" Q.C.	20A, 300V
354 900	1/4" Q.C.	30A, 300V
354 101-GY	P.C. Board	15A, 300V

*30 amp capability is based on temperature rise with #10 AWG wire properly soldered.





OPTION:

Two different style clips can be supplied for circuit identity or polarization. Contact factory.

PATENTS: Patented.

ORDERING INFORMATION:

Catalog Number					
Solder Type Terminals	NEMA Style 3/16" Q.C. Terminals	1/4" Q.C. Terminals	NEMA Style 1/4" Q.C. Terminals	Number of Poles	Reference Dimension "A"
354 001-GY	**354** 601-GY	**354** 801-GY	**354** 901-GY	1	.50"
354 002-GY	**354** 602-GY	**354** 802-GY	**354** 902-GY	2	1.12"
354 003-GY	**354** 603-GY	**354** 803-GY	**354** 903-GY	3	1.75"
354 004-GY	**354** 604-GY	**354** 804-GY	**354** 904-GY	4	2.38"
354 005-GY	**354** 605-GY	**354** 805-GY	**354** 905-GY	5	3.00"
354 006-GY	**354** 606-GY	**354** 806-GY	**354** 906-GY	6	3.63"
354 007-GY	**354** 607-GY	**354** 807-GY	**354** 907-GY	7	4.25"
354 008-GY	**354** 608-GY	**354** 808-GY	**354** 908-GY	8	4.88"
354 009-GY	**354** 609-GY	**354** 809-GY	**354** 909-GY	9	5.50"
354 010-GY	**354** 610-GY	**354** 810-GY	**354** 910-GY	10	6.13"
354 011-GY	**354** 611-GY	**354** 811-GY	**354** 911-GY	11	6.75"
354 012-GY	**354** 612-GY	**354** 812-GY	**354** 912-GY	12	7.38"
354 021-BL*	**354** 621-BL*	**354** 821-BL*	**354** 921-BL*	1	.50"
354 101-GY	—	—	—	1	.50"

* With Anti-Rotation Boss

FOR 1½″ LONG MIDGET FUSES

600 Volt Molded Base Type

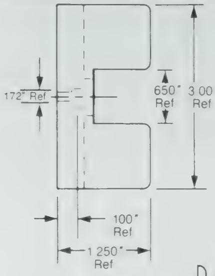
Spacing-saving, 600 volt, molded base fuse blocks with side barriers for isolation. For use with 13/32″ ×1½″ midget fuses. By sliding and locking blocks together any number of poles can be achieved. Class CC fuses have a rejection feature on one end cap which mates with the rejection feature of Littelfuse Class CC fuse blocks and fuseholders to prevent the installation of fuses with lower voltage ratings or interrupting ratings.

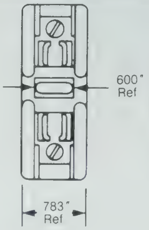
AGENCY APPROVALS:⁰
Midget Blocks: Recognized under the Components Program of Underwriters Laboratories. Certified by CSA.
Class CC Blocks: UL Listed. Certified by CSA.

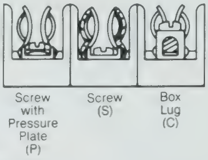
SPECIFICATIONS:
Electrical: Screw terminal, pressure plate terminal, and box lug terminals rated for 30 amperes. Q.C. terminals rated for 20 amperes.
Dielectric Strength: 1200 volts minimum.
Clip/Terminals: Tin plated Copper Alloy.
Box Lug: Copper.
Screws and Captive Pressure Plate: Zinc plated steel.
Reinforcing Spring: Stainless steel. Contact factory for availability.
Base: Thermoplastic. UL 94V0 flammability rating.
Ambient Temperature: 105°C maximum.

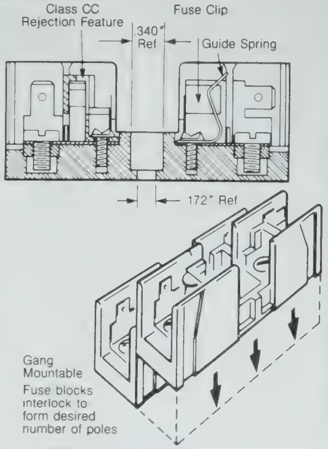
PATENTS: Patented.

DIMENSIONS:

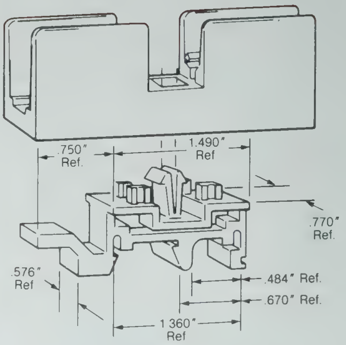








Gang Mountable
Fuse blocks interlock to form desired number of poles



Installation of #FBDIN1 DIN Rail Adapter to fuse block permits assemblies to be snapped to 32mm asymmetrical or 35mm symmetrical ("hat" type) DIN rails.

ORDERING INFORMATION:

Catalog Number		Number of Poles	Connector Type	Maximum Wire Size
Midget	Class CC			
L60030M-1C	L60030C-1C	1	Copper Box Lug	# 6 CU
L60030M-2C	L60030C-2C	2	Copper Box Lug	
L60030M-3C	L60030C-3C	3	Copper Box Lug	
L60030M-1SQ	L60030C-1SQ	1	Screw/Q.C. Terminal	#10 CU
L60030M-2SQ	L60030C-2SQ	2	Screw/Q.C. Terminal	
L60030M-3SQ	L60030C-3SQ	3	Screw/Q.C. Terminal	
L60030M-1PQ	L60030C-1PQ	1	Pressure Plate/Q.C. Terminal	#10 CU
L60030M-2PQ	L60030C-2PQ	2	Pressure Plate/Q.C. Terminal	
L60030M-3PQ	L60030C-3PQ	3	Pressure Plate/Q.C. Terminal	

DIN Rail Adapter: Part No. FBDIN1.

FOR 3AG FUSES

Solder Terminal Molded Base Type

APPROVALS: Recognized under the Components Program of Underwriters Laboratories.

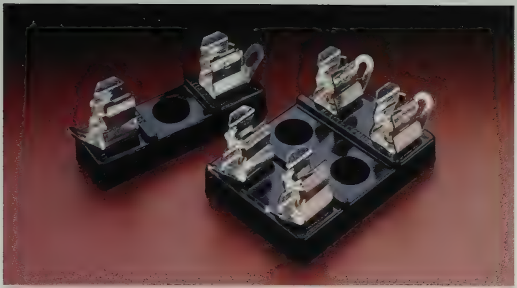
SPECIFICATIONS:
Electrical: Rated for currents up to 15 amperes (units with spring brass clips) or 30 amperes (beryllium copper clips).
Clip/Terminal: One-piece clip/solder type terminal with elongated hole .09″ x .16″. Tin plated spring brass (**357** 001, **357** 002) or silver plated beryllium copper (**350** 221, **350** 284).
Base: Black thermoset with UL 94V0 flammability rating.

ORDERING INFORMATION:

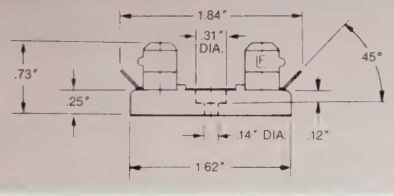
Catalog Number			
Spring Brass	Beryllium Copper	Number of Poles	Width
357 001	**350** 221	1	0.50″ Ref.
357 002	**350** 284	2	1.13″ Ref.

NOTE: For 3-12 pole fuse blocks with tin plated spring brass terminals, see preferred **354** series OMNI-BLOK®

(2 pole units have mounting holes on .625″ centers.)



REFERENCE DIMENSIONS:



Quick Connect Terminal Molded Base Type

APPROVALS: Recognized under the Components Program of Underwriters Laboratories.

SPECIFICATONS:
Electrical: Rated for currents up to 15 amperes.
Clips: Nickel-plated spring brass. Ear type.
Terminals: Plated brass.
Base: Black thermoset with UL 94V0 flammability rating.

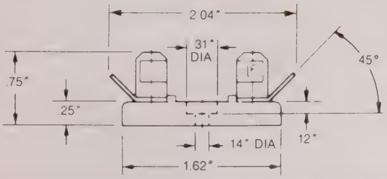
ORDERING INFORMATION:

Catalog Number			
1/4″ Terminal	3/16″ Terminal	Number of Poles	Width
350 329	**350** 327	1	0.50″ Ref.
350 330	**350** 328	2	1.13″ Ref.

NOTE: For 3-12 pole fuse blocks, see preferred **354** series OMNI-BLOK.®

(2 pole units have mounting holes on .625″ centers.)

REFERENCE DIMENSIONS:



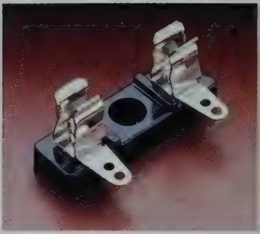
FOR 3AG OR 1½″ LONG MIDGET FUSES

3AG Side Terminal Molded Base Type

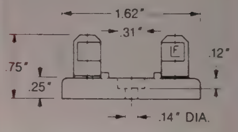
SPECIFICATIONS:
Electrical: Rated for currents up to 15 amperes.
Clips: Nickel plated spring brass. Ear type.
Terminals: Tin plated copper alloy. Solder type.
Base: Black thermoset with UL 94V0 flammability rating.

ORDERING INFORMATION:

Catalog Number	Width Base	 Overall
350 218	0.50″ Ref.	0.81″ Ref.



REFERENCE DIMENSIONS:

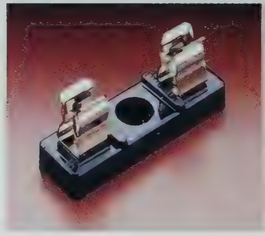


3AG Spare Fuseholder Molded Base Type

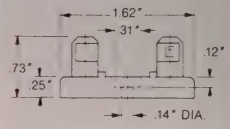
SPECIFICATIONS:
Clips: Nickel plated spring brass. Ear type.
Base: Black thermoset with UL 94V0 flammability rating.

ORDERING INFORMATION:

Catalog Number	Width
350 244	0.50″ Ref.



REFERENCE DIMENSIONS:



3AG or 1½″ Long Midget, Screw Terminal Laminated Base Type

APPROVALS:[0] **356** 000 **Series** (250V) and **556** 000 **Series** (600V) are Recognized under the Components Program of Underwriters Laboratories.

SPECIFICATONS:
Electrical: Rated for currents up to 15 amperes (units with spring brass clips) or up to 30 amperes (beryllium copper clips).
Clips: 356 000 **Series:** Nickel plated spring brass.
359 000 **Series:** Silver plated beryllium copper.
556 000 **Series:** Silver plated beryllium copper.
Terminals: 8-32THD screw type.
Base: Black phenolic laminate

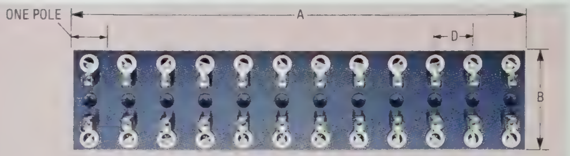
Mounting Hole: 3AG Block: Reference Dimensions .142″/.147″ diameter with .295″/.302″ × 82°C.S.
Midget Blocks: .171″/.176″ diameter with .342″/.349″ × 82°C.S.

ORDERING INFORMATION:
(including Reference Dimensions)

	FOR 3AG FUSES			FOR MIDGET FUSES	
NO. OF POLES	DIMENSION "A"	CATALOG NUMBER		DIMENSION "A"	CATALOG NUMBER
1	.78″	**356** 001	**359** 001	.84″	**556** 001
2	1.69″	**356** 002	**359** 002	1.81″	**556** 002
3	2.59″	**356** 003	**359** 003	2.78″	**556** 003
4	3.50″	**356** 004	**359** 004	3.75″	**556** 004
5	4.41″	**356** 005	**359** 005	4.72″	**556** 005
6	5.31″	**356** 006	**359** 006	5.69″	**556** 006
7	6.21″	**356** 007	**359** 007	6.66″	**556** 007
8	7.12″	**356** 008	**359** 008	7.63″	**556** 008
9	8.03″	**356** 009	**359** 009	8.59″	**556** 009
10	8.94″	**356** 010	**359** 010	9.56″	**556** 010
11	9.84″	**356** 011	**359** 011	10.53″	**556** 011
12	10.75″	**356** 012	**359** 012	11.50″	**556** 012

REFERENCE DIMENSIONS:

FUSE TYPE	A	B	C	D	E
3AG	See	2.38″	.25″	.91″	.73″
MIDGET	Chart	2.75″	.28″	.97″	1.03″



C = Board Thickness E = Overall Height

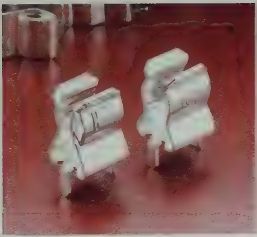
356 000, **359** 000, AND **556** 000 **Series**

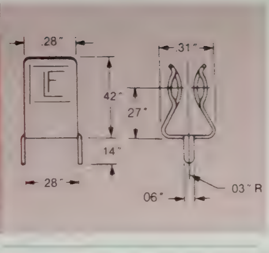
FOR ¼" DIAMETER FUSES

Traditional P.C. Board Type

ORDERING INFORMATION:

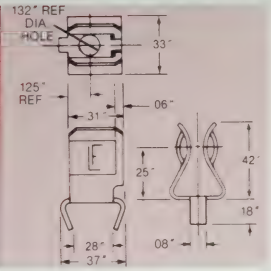
Catalog Number	Clip Material*	Finish	Style
102 071	Spring Brass	Tin-plated	Ear
102 074	Spring Brass	Tin-plated	Earless
102 075	Spring Brass	Hot Tin	Earless
102 076	Spring Brass	Hot Tin	Ear
122 083	Beryllium Copper	Silver-plated	Ear
122 087	Beryllium Copper	Silver-plated	Earless
122 088	Beryllium Copper	Tin-plated	Ear
122 093	Beryllium Copper	Tin-plated	Earless





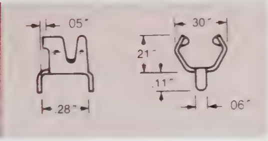
Bowed Tab P.C. Board Type

Catalog Number	Clip Material*	Finish	Style
102 078	Spring Brass	Tin-plated	Earless
102 079	Spring Brass	Tin-plated	Ear
102 082	Spring Brass	Hot Tin	Ear



Low Profile P.C. Board Type

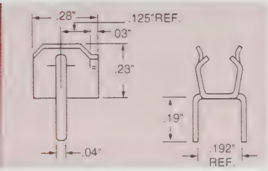
Catalog Number	Clip Material*	Finish	Style
102 080	Spring Brass	Tin-plated	Ear
122 090	Beryllium Copper	Silver-plated	Ear



Low Profile P.C. Board Type

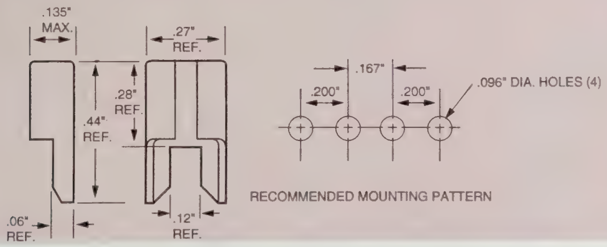
Catalog Number	Clip Material*	Finish	Style
100 058	Spring Brass	Tin-plated	Ear

*NOTE: Spring brass clips are suitable for current levels up to 15 amperes; beryllium copper clips up to 30 amperes



Autofuse® Fuse Clip P.C. Board Type

#100057 spring brass, tin-plated clips available for printed circuit board mounting. Suitable for current levels up to 15 amperes. First time fuse insertion force may approach 40 lbs.



FOR VARIOUS DIAMETER FUSES

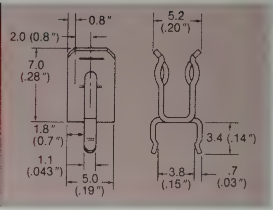
For 2AG or 5 mm Diameter Fuses P.C. Board Type

ORDERING INFORMATION:

Catalog Number	Clip Material	Finish	Style
111 501	Spring Brass	Tin-plated	Ear
111 506	Beryllium Copper	Tin-plated	Ear
111 505	Beryllium Copper	Tin-plated	Surface Mount

NOTE: Suitable for current levels up to 10 amperes;

NOTE: Metric dimensions are shown. Inch dimensions are in parentheses.



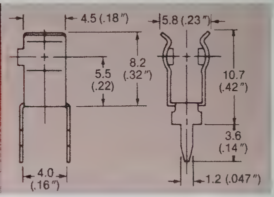
For 5 mm Diameter Fuses P.C. Board Type

ORDERING INFORMATION:

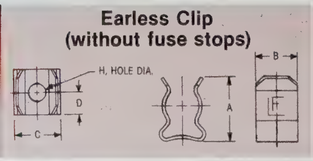
Catalog Number	Clip Material	Finish	Style
100 054	Spring Brass	Silver-plated	Ear
100 056	Spring Brass	Tin-plated	Ear

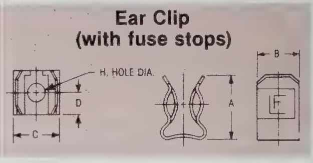
NOTE: Spring brass clips are suitable for current levels up to 10 amperes.

NOTE: Metric dimensions are shown. Inch dimensions are in parentheses.



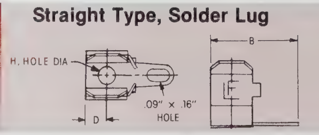
For 1/4" – 13/16" Diameter Fuses Rivet/Eyelet Mount Type

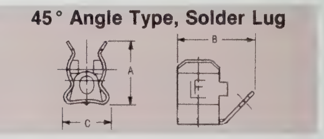

Earless Clip (without fuse stops)


Ear Clip (with fuse stops)

† See Ordering Information below.

For 1/4" Diameter Fuses Rivet/Eyelet Mount Solder Type


Straight Type, Solder Lug


45° Angle Type, Solder Lug

ORDERING INFORMATION:

Style	Fuse Type	Catalog Number Spring Brass Nickel-plated	 Beryllium Copper Silver-plated	Fuse Diameter	A	B	C	D	H Diameter
† Ear	3AG	**101** 001	**121** 001	1/4"	.48"	.31"	.30"	.16"	.131"
	Midget	**105** 001	**125** 001	13/32"	.75"	.44"	.52"	.22"	.196"
	NEC 1—30 amp	**107** 001	**127** 001	9/16"	.94"	.59"	.65"	.25"	.203"
	NEC 30—60 amp	**109** 001**	**129** 001	13/16"	1.31"	.75"	.87"	.30"	.265"
† Earless	3AG	**101** 002	**121** 002	1/4"	.48"	.31"	.30"	.16"	.131"
	Midget	**105** 002	**125** 002	13/32"	.75"	.44"	.52"	.22"	.196"
	NEC 1—30 amp	**107** 002	**127** 002	9/16"	.94"	.59"	.65"	.25"	.203"
	NEC 30—60 amp	**109** 002**	**129** 002	13/16"	1.31"	.75"	.87"	.30"	.265"
Solder Lug 45°	3AG	**101** 003*	**121** 004	1/4"	.47"	.56"	.31"	.16"	.131"
Solder Lug Straight	3AG	**102** 064*	——	1/4"	.47"	.64"	.31"	.16"	.131"

*Tin-plated **Bare Phos. Bronze

FUSES

Approved to MIL-F-15160

F01A FUSES MIL-F-15160/1
(Commercial Equivalent — 361 Series)

MIL Type Designation	Nickel-Plated Caps	Silver-Plated Caps
F01A 250V 1/200A	**364**.005	**366**.005
F01A 250V 1/100A	**364**.010	**366**.010
F01A 250V 1/32A	**364**.031	**366**.031
F01A 250V 1/16A	**364**.062	**366**.062
F01A 250V 1/10A	**364**.100	★
F01A 250V 1/8A	**364**.125	**366**.125
F01A 250V 3/16A	★	★
F01A 250V 2/10A	★	★
F01A 250V 1/4A	**364**.250	**366**.250
F01A 250V 3/8A	**364**.375	**366**.375
F01A 250V 4/10A	★	★
F01A 250V 1/2A	**364**.500	**366**.500
F01A 125V 6/10A	**364**.600	★
F01A 125V 3/4A	**364**.750	**366**.750
F01A 125V 8/10A	★	★
F01A 125V 1A	**364** 001	**366** 001
F01A 125V 1-1/4A	★	★
F01A 125V 1-1/2A	**364** 01.5	**366** 01.5
F01A 125V 1-6/10A	★	★
F01A 125V 2A	**364** 002	**366** 002
F01A 125V 2-1/2A	★	★
F01A 125V 3A	**364** 003	**366** 003
F01A 125V 3-2/10A	★	★
F01A 125V 4A	**364** 004	★
F01A 125V 5A	**364** 005	★

F02A FUSES MIL-F-15160/2
(Commercial Equivalent — 311, 312 Series)

MIL Type Designation	Nickel-Plated Caps	Silver-Plated Caps
F02A 250V 1/100A	**392**.010	**397**.010
F02A 250V 1/32A	**392**.031	**397**.031
F02A 250V 1/16A	**392**.062	**397**.062
F02A 250V 1/8A	**392**.125	**397**.125
F02A 250V 15/100A	**392**.150	★
F02A 250V 175/1000A	**392**.175	★
F02A 250V 3/16A	**392**.187	**397**.187
F02A 250V 2/10A	**392**.200	**397**.200
F02A 250V 1/4A	**392**.250	**397**.250
F02A 250V 3/10A	**392**.300	**397**.300
F02A 250V 3/8A	**392**.375	**397**.375
F02A 250V 1/2A	**392**.500	**397**.500
F02A 250V 6/10A	**392**.600	**397**.600
F02A 250V 3/4A	**392**.750	**397**.750
F02A 250V 1A	**392** 001	**397** 001
F02A 250V 1-1/4A	**392** 1.25	★
F02A 250V 1-1/2A	**392** 01.5	**397** 01.5
F02A 250V 1-6/10A	**392** 01.6	★
F02A 250V 2A	**392** 002	**397** 002
F02A 250V 2-1/2A	**392** 02.5	**397** 02.5
F02A 250V 3A	**392** 003	**397** 003
F02A 250V 4A	**392** 004	**397** 004
F02A 250V 5A	**392** 005	**397** 005
F02A 250V 6A	**392** 006	**397** 006
F02A 125V 8A	**392** 008	**397** 008
F02A 125V 10A	**392** 010	**397** 010
F02A 32V 15A	**392** 015	**397** 015
F02A 32V 20A	**392** 020	**397** 020
F02A 32V 25A	**392** 025	**397** 025

F02B FUSES MIL-F-15160/2
(Commercial Equivalent — 313 Series)

MIL Type Designation	Nickel-Plated Caps	Silver-Plated Caps
F02B 250V 1/100A	**393**.010	**398**.010
F02B 250V 1/32A	**393**.031	**398**.031
F02B 250V 1/25A	**393**.040	**398**.040
F02B 250V 1/16A	**393**.062	**398**.062
F02B 250V 1/10A	**393**.100	**398**.100
F02B 250V 1/8A	**393**.125	**398**.125
F02B 250V 15/100A	**393**.150	**398**.150
F02B 250V 175/1000A	**393**.175	**398**.175
F02B 250V 3/16A	**393**.187	**398**.187
F02B 250V 2/10A	**393**.200	**398**.200
F02B 250V 1/4A	**393**.250	**398**.250
F02B 250V 3/10A	**393**.300	**398**.300
F02B 250V 3/8A	**393**.375	**398**.375
F02B 250V 4/10A	**393**.400	**398**.400
F02B 250V 1/2A	**393**.500	**398**.500
F02B 250V 6/10A	**393**.600	**398**.600
F02B 250V 7/10A	**393**.700	**398**.700
F02B 250V 3/4A	**393**.750	**398**.750
F02B 250V 8/10A	**393**.800	**398**.800
F02B 250V 1A	**393** 001	**398** 001
F02B 250V 1-1/4A	**393** 1.25	**398** 1.25
F02B 250V 1-1/2A	**393** 01.5	**398** 01.5
F02B 250V 1-6/10A	**393** 01.6	**398** 01.6
F02B 250V 1-8/10A	**393** 01.8	**398** 01.8
F02B 250V 2A	**393** 002	**398** 002
F02B 250V 2-1/4A	**393** 2.25	**398** 2.25
F02B 250V 2-1/2A	**393** 02.5	**398** 02.5
F02B 250V 2-8/10A	**393** 02.8	**398** 02.8
F02B 250V 3A	**393** 003	**398** 003
F02B 250V 3-2/10A	**393** 03.2	**398** 03.2

F03A FUSES MIL-F-15160/3
(Commercial Equivalent — 314 Series)

MIL Type Designation	Nickel-Plated Caps	Silver-Plated Caps
F03A 250V 1/4A	**394**.250	**399**.250
F03A 250V 1/2A	**394**.500	**399**.500
F03A 250V 1A	**394** 001	**399** 001
F03A 250V 1-1/4A	★	★
F03A 250V 1-1/2A	**394** 01.5	**399** 01.5
F03A 250V 2A	**394** 002	**399** 002
F03A 250V 3A	**394** 003	**399** 003
F03A 250V 4A	**394** 004	**399** 004
F03A 250V 5A	**394** 005	**399** 005
F03A 250V 6A	**394** 006	**399** 006
F03A 250V 8A	**394** 008	**399** 008
F03A 250V 10A	**394** 010	**399** 010
F03A 250V 12A	**394** 012	**399** 012
F03A 250V 15A	**394** 015	**399** 015
F03A 125V 20A	**394** 020	**399** 020
F03A 125V 25A	**394** 025	**399** 025
F03A 125V 30A	**394** 030	**399** 030

NOTES:
1. The suffix letter "S" added to the type designation indicates that silver-plated fuse caps are required. For example: F02A 250V 3/4A S
2. ★ Contact factory.
3. Boldface numbers indicate series; light type numbers indicate amperage value.

Approved to MIL-F-15160

F03B FUSES MIL-F-15160/3
(Commercial Equivalent — 326 Series)

MIL Type Designation	Nickel-Plated Caps	Silver-Plated Caps
F03B 250V 1/100A	**390**.010	**395**.010
F03B 250V 1/32A	**390**.031	**395**.031
F03B 250V 1/16A	**390**.062	**395**.062
F03B 250V 1/10A	**390**.100	**395**.100
F03B 250V 1/8A	**390**.125	**395**.125
F03B 250V 15/100A	**390**.150	**395**.150
F03B 250V 175/1000A	**390**.175	**395**.175
F03B 250V 3/16A	**390**.187	**395**.187
F03B 250V 2/10A	**390**.200	**395**.200
F03B 250V 1/4A	**390**.250	**395**.250
F03B 250V 3/10A	**390**.300	**395**.300
F03B 250V 3/8A	**390**.375	**395**.375
F03B 250V 4/10A	**390**.400	**395**.400
F03B 250V 1/2A	**390**.500	**395**.500
F03B 250V 6/10A	**390**.600	**395**.600
F03B 250V 7/10A	**390**.700	**395**.700
F03B 250V 3/4A	**390**.750	**395**.750
F03B 250V 8/10A	**390**.800	**395**.800
F03B 250V 1A	**390** 001	**395** 001
F03B 250V 1-2/10A	**390** 01.2	**395** 01.2
F03B 250V 1-1/4A	**390** 1.25	**395** 1.25
F03B 250V 1-1/2A	**390** 01.5	**395** 01.5
F03B 250V 1-6/10A	**390** 01.6	**395** 01.6
F03B 250V 2A	**390** 002	**395** 002
F03B 250V 2-1/2A	**390** 02.5	**395** 02.5
F03B 250V 2-8/10A	**390** 02.8	**395** 02.8
F03B 250V 3A	**390** 003	**395** 003
F03B 250V 3-2/10A	**390** 03.2	**395** 03.2
F03B 125V 4A	**390** 004	**395** 004
F03B 125V 5A	**390** 005	**395** 005
F03B 125V 6-1/4A	**390** 6.25	**395** 6.25
F03B 125V 7A	**390** 007	**395** 007
F03B 125V 8A	**390** 008	**395** 008
F03B 125V 10A	**390** 010	**395** 010
F03B 125V 15A	**390** 015	**395** 015
F03B 125V 20A	**390** 020	**395** 020
F03B 125V 25A	**390** 025	**395** 025

F09A FUSES MIL-F-15160/9
(Commercial Equivalent — BLN Series)

MIL Type Designation	Nickel-Plated Caps	Silver-Plated Caps
F09A 250V 1A	**594** 001	**594** 001S
F09A 250V 2A	**594** 002	**594** 002S
F09A 250V 3A	**594** 003	**594** 003S
F09A 250V 4A	**594** 004	**594** 004S
F09A 250V 5A	**594** 005	**594** 005S
F09A 250V 6A	**594** 006	**594** 006S
F09A 250V 7A	**594** 007	**594** 007S
F09A 250V 8A	**594** 008	**594** 008S
F09A 250V 10A	**594** 010	**594** 010S
F09A 250V 12A	**594** 012	**594** 012S
F09A 250V 15A	**594** 015	**594** 015S
F09A 250V 20A	**594** 020	**594** 020S
F09A 250V 25A	**594** 025	**594** 025S
F09A 250V 30A	**594** 030	**594** 030S

F09B FUSES MIL-F-15160/9
(Commercial Equivalent — FLM Series)

MIL Type Designation	Nickel-Plated Caps	Silver-Plated Caps
F09B 250V 3/10A	**593**.300	**593**.300S
F09B 250V 4/10A	**593**.400	**593**.400S
F09B 250V 1/2A	**593**.500	**593**.500S
F09B 250V 6/10A	**593**.600	**593**.600S
F09B 250V 8/10A	**593**.800	**593**.800S
F09B 250V 1A	**593** 001	**593** 001S
F09B 250V 1-1/8A	**593** 1.12	**593** 1.12S
F09B 250V 1-1/4A	**593** 1.25	**593** 1.25S
F09B 250V 1-4/10A	**593** 01.4	**593** 01.4S
F09B 250V 1-1/2A	**593** 01.5	**593** 01.5S
F09B 250V 1-6/10A	**593** 01.6	**593** 01.6S
F09B 250V 1-8/10A	**593** 01.8	**593** 01.8S
F09B 250V 2A	**593** 002	**593** 002S
F09B 250V 2-1/4A	**593** 2.25	**593** 2.25S
F09B 250V 2-1/2A	**593** 02.5	**593** 02.5S
F09B 250V 2-8/10A	**593** 02.8	**593** 02.8S
F09B 250V 3A	**593** 003	**593** 003S
F09B 250V 3-2/10A	**593** 03.2	**593** 03.2S
F09B 250V 3-1/2A	**593** 03.5	**593** 03.5S
F09B 250V 4A	**593** 004	**593** 004S
F09B 250V 4-1/2A	**593** 04.5	**593** 04.5S
F09B 250V 5A	**593** 005	**593** 005S
F09B 250V 5-6/10A	**593** 05.6	**593** 05.6S
F09B 250V 6A	**593** 006	**593** 006S
F09B 250V 6-1/4A	**593** 6.25	**593** 6.25S
F09B 250V 7A	**593** 007	**593** 007S
F09B 250V 8A	**593** 008	**593** 008S
F09B 250V 9A	**593** 009	**593** 009S
F09B 250V 10A	**593** 010	**593** 010S
F09B 125V 12A	**593** 012	**593** 012S
F09B 125V 15A	**593** 015	**593** 015S
F09B 32V 20A	**593** 020	**593** 020S
F09B 32V 25A	**593** 025	**593** 025S
F09B 32V 30A	**593** 030	**593** 030S

F60C FUSES MIL-F-15160/60
(Commerical Equivalent — KLK Series)

MIL Type Designation	Nickel-Plated Caps	Silver-Plated Caps
F60C 500V 1/8A	**592**.125	**592**.125S
F60C 500V 2/10A	**592**.200	**592**.200S
F60C 500V 1/4A	**592**.250	**592**.250S
F60C 500V 3/10A	**592**.300	**592**.300S
F60C 500V 3/8A	**592**.375	**592**.375S
F60C 500V 1/2A	**592**.500	**592**.500S
F60C 500V 3/4A	**592**.750	**592**.750S
F60C 500V 1A	**592** 001	**592** 001S
F60C 500V 1-1/2A	**592** 01.5	**592** 01.5S
F60C 500V 2A	**592** 002	**592** 002S
F60C 500V 3A	**592** 003	**592** 003S
F60C 500V 4A	**592** 004	**592** 004S
F60C 500V 5A	**592** 005	**592** 005S
F60C 500V 6A	**592** 006	**592** 006S
F60C 500V 8A	**592** 008	**592** 008S
F60C 500V 10A	**592** 010	**592** 010S
F60C 500V 15A	**592** 015	**592** 015S
F60C 500V 20A	**592** 020	**592** 020S
F60C 500V 25A	**592** 025	**592** 025S
F60C 500V 30A	**592** 030	**592** 030S

[illegible] The suffix letter "S" added to the type designation indicates that silver-plated fuse caps are required. For example: F02A 250V 3/4A S.

2. Boldface numbers of catalog number indicate series; light type numbers indicate amperage value.

FUSES

Approved to MIL-F-23419

FM02 FUSES MIL-F-23419/2
(Commercial Equivalent — 273 Series Microfuses)

MIL Type Designation	Catalog Number
FM02 A 125V 1/500A	**274**.002
FM02 A 125V 1/200A	**274**.005
FM02 A 125V 1/100A	**274**.010
FM02 A 125V 1/64A	**274**.015
FM02 A 125V 1/32A	**274**.031
FM02 A 125V 1/16A	**274**.062
FM02 A 125V 1/10A	**274**.100
FM02 A 125V 1/8A	**274**.125
FM02 A 125V 2/10A	**274**.200
FM02 A 125V 1/4A	**274**.250
FM02 A 125V 3/10A	**274**.300
FM02 A 125V 4/10A	**274**.400
FM02 A 125V 1/2A	**274**.500
FM02 A 125V 6/10A	**274**.600
FM02 A 125V 3/4A	**274**.750
FM02 A 125V 1A	**274** 001
FM02 A 125V 1-1/2A	**274** 01.5
FM02 A 125V 2A	**274** 002
FM02 A 125V 3A	**274** 003
FM02 A 125V 4A	**274** 004
FM02 A 125V 5A	**274** 005

FM04 FUSES MIL-F-23419/4
(Commercial Equivalent — 275 Series Picofuses)

Not recommended for new design — use FM 10

MIL Type Designation	Catalog Number
FM04 A 125V 1/16A	**277**.062
FM04 A 125V 1/8A	**277**.125
FM04 A 125V 1/4A	**277**.250
FM04 A 125V 3/8A	**277**.375
FM04 A 125V 1/2A	**277**.500
FM04 A 125V 3/4A	**277**.750
FM04 A 125V 1A	**277** 001
FM04 A 125V 1-1/2A	**277** 01.5
FM04 A 125V 2A	**277** 002
FM04 A 125V 3A	**277** 003
FM04 A 125V 4A	**277** 004
FM04 A 125V 5A	**277** 005
FM04 A 125V 7A	**277** 007
FM04 A 125V 10A	**277** 010
FM04 A 32V 15A	**277** 015

FM07 FUSES MIL-F-23419/7
(Commercial Equivalent — 262 Series Microfuses)

MIL Type Designation	Catalog Number
FM07 A 125V 1/500A	**269**.002
FM07 A 125V 1/200A	**269**.005
FM07 A 125V 1/100A	**269**.010
FM07 A 125V 1/64A	**269**.015
FM07 A 125V 1/32A	**269**.031
FM07 A 125V 1/20A	**269**.050
FM07 A 125V 1/16A	**269**.062
FM07 A 125V 1/10A	**269**.100
FM07 A 125V 1/8A	**269**.125
FM07 A 125V 2/10A	**269**.200
FM07 A 125V 1/4A	**269**.250
FM07 A 125V 3/10A	**269**.300
FM07 A 125V 4/10A	**269**.400
FM07 A 125V 1/2A	**269**.500
FM07 A 125V 6/10A	**269**.600
FM07 A 125V 7/10A	**269**.700
FM07 A 125V 3/4A	**269**.750
FM07 A 125V 8/10A	**269**.800
FM07 A 125V 1A	**269** 001
FM07 A 125V 1-1/2A	**269** 01.5
FM07 A 125V 2A	**269** 002
FM07 A 125V 3A	**269** 003
FM07 A 125V 4A	**269** 004
FM07 A 125V 5A	**269** 005

FM08 FUSES MIL-F-23419/8
(Commerical Equivalent — 265 Series Picofuses)

MIL Type Designation	Catalog Number
FM08 A 125V 1/8A	**267**.125
FM08 A 125V 1/4A	**267**.250
FM08 A 125V 3/8A	**267**.375
FM08 A 125V 1/2A	**267**.500
FM08 A 125V 3/4A	**267**.750
FM08 A 125V 1A	**267** 001
FM08 A 125V 1-1/2A	**267** 01.5
FM08 A 125V 2A	**267** 002
FM08 A 125V 2-1/2A	**267** 02.5
FM08 A 125V 3A	**267** 003
FM08 A 125V 4A	**267** 004
FM08 A 125V 5A	**267** 005
FM08 A 125V 7A	**267** 007
FM08 A 125V 10A	**267** 010
FM08 A 32V 15A	**267** 015

FM10 FUSES MIL-F-23419/10
(Commercial Equivalent — 251 Series Picofuses)

MIL Type Designation	Catalog Number
FM10 A 125V 1/16A	**253**.062
FM10 A 125V 1/8A	**253**.125
FM10 A 125V 1/4A	**253**.250
FM10 A 125V 3/8A	**253**.375
FM10 A 125V 1/2A	**253**.500
FM10 A 125V 3/4A	**253**.750
FM10 A 125V 1A	**253** 001
FM10 A 125V 1-1/2A	**253** 01.5
FM10 A 125V 2A	**253** 002
FM10 A 125V 3A	**253** 003
FM10 A 125V 4A	**253** 004
FM10 A 125V 5A	**253** 005
FM10 A 125V 7A	**253** 007
FM10 A 125V 10A	**253** 010
FM10 A 32V 15A	**253** 015

Boldface numbers of catalog number indicate series; light type numbers indicate amperage value.

Approved to DESC Drawing No. 87108

Fast-Acting 2AG Cartridge Fuses
(Commercial Equivalent — 225 Series)

DESC Part Number	Voltage Rating	Ampere Rating	Catalog Number
87108-001A	250V	⅛	**288**.125
87108-003A	250V	¼	**288**.250
87108-005A	250V	⅜	**288**.375
87108-007A	250V	½	**288**.500
87108-011A	250V	¾	**288**.750
87108-015A	250V	1	**288** 001
87108-019A	250V	1½	**288** 01.5
87108-021A	250V	2	**288** 002
87108-025A	250V	2½	**288** 02.5
87108-027A	250V	3	**288** 003
87108-029A	250V	3½	**288** 03.5
87108-031A	125V	4	**288** 004
87108-033A	125V	5	**288** 005
87108-035A	125V	7	**288** 007

Fast-Acting 2AG Axial Lead Fuses
(Commercial Equivalent — 224 Series)

DESC Part Number	Voltage Rating	Ampere Rating	Catalog Number
87108-002A	250V	⅛	**289**.125
87108-004A	250V	¼	**289**.250
87108-006A	250V	⅜	**289**.375
87108-008A	250V	½	**289**.500
87108-012A	250V	¾	**289**.750
87108-016A	250V	1	**289** 001
87108-020A	250V	1½	**289** 01.5
87108-022A	250V	2	**289** 002
87108-026A	250V	2½	**289** 02.5
87108-028A	250V	3	**289** 003
87108-030A	250V	3½	**289** 03.5
87108-032A	125V	4	**289** 004
87108-034A	125V	5	**289** 005
87108-036A	125V	7	**289** 007

Slo-Blo® 2AG Cartridge Fuses
(Commercial Equivalent — 229 Series)

DESC Part Number	Voltage Rating	Ampere Rating	Catalog Number
87108-003B	250V	¼	**290**.250
87108-005B	250V	⅜	**290**.375
87108-007B	250V	½	**290**.500
87108-009B	250V	6/10	**290**.600
87108-011B	250V	¾	**290**.750
87108-015B	250V	1	**290** 001
87108-017B	250V	1¼	**290** 1.25
87108-019B	250V	1½	**290** 01.5
87108-021B	250V	2	**290** 002
87108-023B	250V	2¼	**290** 2.25
87108-025B	250V	2½	**290** 02.5
87108-027B	250V	3	**290** 003
87108-029B	250V	3½	**290** 03.5
87108-031B	125V	4	**290** 004
87108-033B	125V	5	**290** 005
87108-035B	125V	7	**290** 007

Slo-Blo® 2AG Axial Lead Fuses
(Commercial Equivalent — 230 Series)

DESC Part Number	Voltage Rating	Ampere Rating	Catalog Number
87108-004B	250V	¼	**291**.250
87108-006B	250V	⅜	**291**.375
87108-008B	250V	½	**291**.500
87108-010B	250V	6/10	**291**.600
87108-012B	250V	¾	**291**.750
87108-016B	250V	1	**291** 001
87108-018B	250V	1¼	**291** 1.25
87108-020B	250V	1½	**291** 01.5
87108-022B	250V	2	**291** 002
87108-024B	250V	2¼	**291** 2.25
87108-026B	250V	2½	**291** 02.5
87108-028B	250V	3	**291** 003
87108-030B	250V	3½	**291** 03.5
87108-032B	125V	4	**291** 004
87108-034B	125V	5	**291** 005
87108-036B	125V	7	**291** 007

Boldface numbers of catalog number indicate series; light type numbers indicate amperage value.

FUSEHOLDERS

Approved to MIL-F-19207

			Specifications			Commercial Equivalent	
MIL Specification	Type Designation	Catalog Number	Type	Electrical Rating	For Fuse Type	Catalog Number	Voltage Range
MIL-F19207/8	FHL17G2	**349**250	Indicating	20A 90 to 250V	3AG,F02,F03	**344**250 **344**125	200 to 250V 100 to 125V
MIL-F19207/9	FHL18G2-1	**349**012	Indicating	20A 12 to 22V	3AG,F02,F03	**344**024	16 to 32V
MIL-F19207/9	FHL18G2-2	**349**023	Indicating	20A 23 to 33V	3AG,F02,F03	**344**024	16 to 32V
MIL-F19207/9	FHL18G2-3	**349**034	Indicating	20A 34 to 45V	3AG,F02,F03	—	—
MIL-F19207/9	FHL18G2-4	**349**046	Indicating	20A 46 to 60V	3AG,F02,F03	—	—
MIL-F19207/9	FHL18G2-5	**349**061	Indicating	20A 61 to 80V	3AG,F02,F03	—	—
MIL-F19207/9	FHL18G2-6	**349**081	Indicating	20A 81 to 90V	3AG,F02,F03	—	—
MIL-F19207/9	FHL18G2-7	**349**002	Indicating	20A 2.5 to 4V	3AG,F02,F03	**344**006	2.5 to 7V
MIL-F19207/9	FHL18G2-8	**349**005	Indicating	20A 5 to 7V	3AG,F02,F03	**344**006	2.5 to 7V
MIL-F19207/9	FHL18G2-9	**349**008	Indicating	20A 8 to 12V	3AG,F02,F03	**344**012	7 to 16V
MIL-F19207/28	FHL44G-1	**284**007	Indicating	5A 12 to 22V	MICRO,FM02,FM07	**284**005	7 to 16V
MIL-F19207/28	FHL44G-2	**284**008	Indicating	5A 23 to 33V	MICRO,FM02,FM07	**284**006	16 to 32V
MIL-F19207/28	FHL44G-3	**284**009	Indicating	5A 34 to 45V	MICRO,FM02,FM07	—	—
MIL-F19207/28	FHL44G-4	**284**010	Indicating	5A 46 to 60V	MICRO,FM02,FM07	—	—
MIL-F19207/28	FHL44G-5	**284**011	Indicating	5A 61 to 80V	MICRO,FM02,FM07	—	—
MIL-F19207/28	FHL44G-6	**284**012	Indicating	5A 81 to 90V	MICRO,FM02,FM07	—	—
MIL-F19207/29	FHL45G	**284**013	Indicating	5A 90 to 125V	MICRO,FM02,FM07	**284**003	100 to 130V
MIL-F19207/11	FHN20G	**342**025	Drip-Proof	20A 250V Max	3AG,F02,F03	**342**004P	250V Max
MIL-F19207/16	FHN26G2	**342**024	Drip-Proof	30A 250V Max	3AG,F02,F03	**342**012P	250V Max
MIL-F19207/16	FHN26W	**342**021	Water-Tight	30A 250V Max	3AG,F02,F03	**342**006	250V Max
MIL-F19207/36	FHN55W	**340**267	Water-Tight—RFI	30A 250V Max	3AG,F02,F03	—	250V Max

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